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Expertise in Coaching Interceptive Sports: A Grounded Theory Model

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Abstract

The task of explaining the intricate and often abstract actions that define expert coaching practice has proven problematic for researchers and coaching practitioners alike. This dilemma was highlighted more than a decade ago by Cassidy, Jones and Potrac (2004) who had suggested that two of the most frequently employed nouns to elaborate on expert coaching practice: 'style' and 'methods', are applied incorrectly. More recently, in an extensive review of research that has examined coaching practice Lyle and Cushion (2010) 'dishearteningly' concede that such endeavours have failed to deliver universally accepted clarity about effective sports coaching. Chi (2006) attributes much of this uncertainty to research that has accepted an incomplete locus of expertise. On the basis of such uncertainty, this study was undertaken with the intent of identifying, determining and understanding the actions that separate effective coaches from a wider population of coaching practitioners.

Using Grounded Theory as a methodological framework, six coaching practitioners from the interceptive sports of Football (Soccer), Rugby League and Rugby Union were each subjected to two semi-structured interviews: an initial interview and a follow up interview to enable research participants to peruse, change or add information to their responses and my summation of their responses. Mindful of Nash and Collins' (2006) suggestion that some coaching practitioners toil when required to verbalise their actions, the data gathered from these interviews was analysed according to Strauss and Corbin's (1998) conditional matrix. Conditional Matrix espoused by Strauss and Corbin was identified and engaged in this research for its capacity to extract implicit meanings and decipher the abstract knowledge structures that often frame a coaching practitioner's account of their daily practices. As a consequence of this research process, twelve categories of coaching actions began to emerge from the responses offered by participants to the research questions. These twelve categories have been refined to establish four distinct pattern of behaviour that each member of the research group subliminally uses to facilitate a decision making process (as opposed to a decision which is often proposed in the review of literature). These four patterns of behaviour have culminated in the proposal of two grounded theory models: 'The Stability / Instability Exchange Model' and the 'Emergent Decision Making Model' as possible indicators of expertise in interceptive sports coaching. The first of these two models: 'The Stability / Instability Exchange Model', recommends how expert coaching practitioners design personal analogies and formulate conceptualisations to identify and focus on the most pertinent environmental information

streams. The Emergent Decision Making Model' proposes how expert coaching practitioners use the personal analogies in conjunction with specific conceptualisation to enable attacking and defensive decisions to emerge from the field of play.

The significance of this research is two-fold. Firstly at an educational level, both the "Stability / Instability Exchange Model' and the 'Emergent Decision Making Model' rely inherently on a coaching practitioner's ability to self-organise environmental information with existing knowledge structures. As such formal coaching education programs may need to consider introducing or dedicating more time to the design and application of dynamic knowledge processes. Finally at an academic level, in accordance with the recommendations of Chi (2006) and Ericsson and Smith (1991) it would appear that both the 'Stability / Instability Exchange Model' and the 'Emergent Decision Making Model' could possible stand as touchstones for a greater examination of expertise in interceptive sports coaching in a laboratory setting.

Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

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Publications during candidature

Peer Reviewed Papers

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Conference Abstracts

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Wharton, L. (2010, October)*. Expertise and Emergent Decision Making: Implications for coaching education*. Paper presented at the International Congress AIESEP, A Coruna, Spain.

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Keywords

Expertise, sports coaching, emergent decision making, imminent awareness, forward reasoning

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List of Abbreviations

ACC	Australian Coaching Council
AIS	Australian Institute of Sport
ASC	Australian Sports Commission
CC	Classical Configurations
CEO	Chief Executive Officer
EDSKS	Extended Domain-specific Knowledge Structures
EPA	Expert Performance Approach
NCAS	National Coaching Accreditation Scheme
NRL	National Rugby League

1. Chapter One – Introduction

1.1. Identifying the Problem

Sport has been widely acknowledged as a fundamental institution in the development of Australian society (Caldwell, 1976; Stoddart, 1986; Cashman, 1997). In fact the contribution of sport to our national identity is so significant that sport has become infused at practically every social stratum within Australian Culture (McKay, 1991; Booth and Tatz, 2000; McKay, 2000). This notion of sport as an omnipresent aspect of the Australian national identity is reinforced by the almost canonised cultural devotion of sport and sports participation within modern-day Australian society.

This socially mediated position of sport in society, and the expectation for participation, is legitimized by discursive formations such as state holidays for sporting events, media coverage, sport retail industries, publicly listed sporting teams, sporting franchises, career opportunities, a political heath agenda and of course by the sheer weight of support through direct and indirect participation. So accustomed is the Australian population to this saturation of sport in modern society that its establishment as a form of popular culture has evolved with relative anonymity (see Billig, 1995). Ghosted autobiographies, feature films, documentaries, computer games, infomercials and even music recordings by significant - and not so significant - sporting identities are common occurrences in the life of modern day Australia.

The ubiquitous nature of sport in Australia is historically identified as a consequence of a basic organising principle of corporeal regulation. For example, Kirk (1998; 2001) maintains that the early colonial governments of the Twentieth century were aware of the need for national stabilization and as such embraced sport as an instrument for the validation of a national identity and strategy for the economic prosperity of a nation. Borrowing from the work of Michel Foucault, Kirk (1998) compares the significance of sport in Australian society as a “mechanism of social normalisation” (p.109) – one that is redolent of political pragmatism. Sport was seen as an efficient method for regulating behaviour by general consensus – national development through social order and control without the exertion of force (Foucault, 1977). However, the fundamental nexus

underpinning Kirk's historical analysis of Australia's sporting culture is to identify sport as a socially complex and mediated entity that cannot be measured by simple or isolated definitions of expertise in sport, a national identity bound in elitism or even contemporary Australian culture.

The interplay between sport, national identity and Australian culture continued until after the 1970s when the way we began to view sport altered. This change emanated from community stakeholders within both politics and business (Cashman, 1995; Cashman, 1997; Stewart, Nicholson, Smith and Westerbeek, 2004). On the political front, opposing parties in a quest for leadership would punch and counter punch with dissimilar systems of bureaucratic codification of sport while the business world began to recognise sport as the perfect instrument for capitalising on an emerging globalized market place. Each of these social processes would combine to formulate a platform that would promote the concept of professionalism and ultimately push the traditional amateur-ideals of our sporting organisations to the margins of Australian society (Stewart et.al., 2004). While the contribution of professionalism to the development of sport and athletic performance is widely acknowledged, there appears to be little understanding of the impact that professionalism has had on the improvement of sports coaching – and most specifically the identification and determination of expert coaching practice. Consequently, to better understand the evolution of coaching practice, it would seem appropriate to first understand the origins and influences of professionalism and the impact that these have had on the progression of coaching effectiveness and the development of expertise in interceptive sports coaching (see page 12).

1.2. Professionalism and the Coaching Framework: A Political Intervention

Until the 1970s, the administration, management and delivery of sporting programs was generally the realm of localised service providers and government department that Australian politics had tendered to kept at arm's length. However, the notion of a centralised and bureaucratic administration of sport was first mooted in the 1970s with a politically driven shift away from the 'autonomous and voluntarist delivery' of physical activity and towards a system involving less sovereignty and greater government

intervention (Henry, 2001; Green, 2004). While both the Whitlam and Fraser Governments (1972 and 1975 respectively) perceived sport as a mechanism for both forging an international identity and as a means for promoting recreation as a life value, each government had a uniquely diverse interpretation of how sport would augment the Australian people's way of life. However, political leaders from both parties were beginning to realise that sport had the potential to enhance the wellbeing of ordinary Australians and as such commissioned two noteworthy initiatives: the Bloomfield Report (1973) and the Coles Inquiry (1975). The product of these investigations was a dramatic alteration in the national framework responsible for the delivery of sports coaching and recreation services in Australia. This move towards a central and bureaucratic system administration was one such alteration and would have a significant impact on how the Australian society would perceive and receive sporting programs that were designed to enhance coaching and athletic performance.

This shift towards a national framework for sports administration (and ultimately coaching) is chronicled, and suitably defined, by a single act of bureaucratic decision making; the construction and implementation of a seminal policy that would predetermine the shape, distribution and governance of federal funding for Australian sports development. Stewart et al., (2004) supports this view by identifying the 'Cash-through Sport' policy of the 1974 Labor led Federal government as the first indication of a move towards a higher order of governance that would oversee the management of Australian sport and recreation. The overall purpose of the 'Cash-through Sport' Policy was to supervise the delivery of a federally funded sports development program. However, reflecting on the recommendations of the Bloomfield Report, it is evident that the 'Cash-through Sport' Policy was introduced as a mechanism to infuse society with triadic model for sports participation. This model of administration would deliver a nationally regulated three pronged reconfiguration of sports promotion and management in Australia. The three focal points of this model: community recreation programs; increasing community consciousness regarding general fitness; and the enhancement of programmes supporting elite level athletes, were implemented nationally and embedded within a performance monism (Booth and Tatz, 2000). Ironically however, while the Bloomfield and Coles reports have influentially argued, and are responsible, for a significantly greater commitment from the Federal government regarding the delivery and maintenance of sport. They each forewarned of the complexities associated with delivering both community and elite sport based programs from the one office.

One of the complexities raised by Bloomfield was the regression that occurs in sports management when dissimilar political opinions are implemented. By the mid-1980s this very concern had evolved into a reality with changing governments. Political instability produced contradictory policy and this resulted in structural anomalies that would stall any national outcomes that could be attained from initiatives concerning the governance of sport and recreation (Stewart et.al, 2004). For example, a Federal government swing late in the 1970s saw the Malcolm Fraser led Liberal Party, which was initially uninterested in programs focusing on either sport or community recreation, assume power and immediately field public concerns for even greater Federal involvement in the development of the elite end of the sports performance spectrum. Promising reform of the previous Labor government's policy, the Fraser led Government would react to mounting public concern that was snowballing since a cheerless Montreal Olympics campaign with the establishment of the Australian Coaching Council (ACC) in 1978. By 1984 the ACC would be absorbed by a returning Labor government initiative: the Australian Sports Commission (ASC). The ASC, just like the ACC before it, was a political response to floundering national identity that was in dire need of success on the international sporting stage. Primarily entrusted with the responsibility of delivering and monitoring both participation and high level performance coaching education programs, the ASC established the National Coaching Accreditation Scheme as a means of developing enhanced coaching practice. These programs were championed as a means of increasing participation rates and developing elite performance through improved access to high performance coaching practice. Ultimately while both political parties have contributed successfully towards the development of participation and performance coaching practice, Stewart et.al (2004) suggests that this political soap boxing has delayed the process with successive restarts and restructuring.

In defence of the ACC and ASC, as foundation organisations there was very little national or international precedence to access when preparing a national curricular for the development of coaching practices. The ACC and ASC were both forced to focus on the experiential practices of a privileged few and their accumulation of 'expert knowledge' as the basis for coaching development programs (Daly, 1991; Stewart et.al. 2004). Consequently, the decision makers of both agencies had inadvertently chosen to apply what McLeod (2008) has described as 'principles of Reductionism'. Wolkenhauer and Green (2013) suggest that in an attempt to better understand complex phenomena researchers have leant on the notion of specialisation to justify reducing these complex

phenomena to isolated parts as a means of identifying and better understanding individual pieces of a complex process. As a research process, reductionism is an ill-conceived approach as the general research questions are often lost in highly specialised research and the results are strongly dependent on experimental context.

While the government appointed decision makers had shown their hand by identifying the experienced and to some degree unqualified coaching practitioners as the Gatekeepers of expert knowledge structures. Their drive towards professionalism was to become even more transparent and singularly focused in 1981 with the establishment of a monument that is dedicated solely towards the achievement of elitism and professional performance: the Australian Institute of Sport (AIS). Interestingly, while the rest of the world admired the physical commitment to elite performance (the AIS), some European coaches were quite forward in their dismissal of Australia's move towards a centralised system of athlete development, the accompanying coaching practices and policies and the primacy of certain knowledge structures (Rushton 1996).

This period of bureaucratic instability (mid 1970s – mid 1980s) is further recognised by the unintentional enactment of a participation / performance continuum – and the subsequent chasm that evolved between 'sport for participation' and 'sport for performance'. This continuum, as a product of political contestation, would contribute significantly to the shape of future coaching frameworks that would be used to develop coaching expertise in Australia. While the two previously mentioned Liberal Government initiatives certainly appear to favour the performance end of the continuum, conservative political leadership had also resulted in shallow infrastructure failing community groups.

While top end athletes and coaching programs were well supported, it was expected that community orientated programs would develop without the same financial support. As Daly (1991) put forward, Australia's civil leaders firmly believed that an investment in national heroes would be returned by increases in participation in community programs. The inaugural head of the AIS Sports Science unit, Dr Richard Telford (1982) reinforces this point by justifying the significant funding of the elite coaching and training environment of the AIS as a community flagship. Telford's comments would imply that the development of the elite coaches and talented performers at the AIS would generate positive spread of coaching practices at the lower echelons of a sporting community. Far from surprising, Telford's comment is typical of neo-liberal politics of the time. The ASC and associated

bureaucrats became preoccupied with chronicling opportunities for the distribution of knowledge by recording coaching accreditation rather than reviewing the quality of outcomes generated by accreditation programs. Subsequently professional development towards a higher level of coaching practice would remain in the realm of individual responsibility.

As mentioned earlier the formation of the ACC, the ASC and the AIS are all clear indicators of each governments desire to eradicate the woeful memories of the 1976 Olympic campaign (Cashman, 1995; Bloomfield, 2003). In contrast to Bloomfield's recommendation for a Recreational (participation) Pyramid (1973), the mandate afforded these superstructural institutions clearly evokes a propensity for the development of elite coaches and elite performances within a controlled and exclusive environment. While the coaching practices that would underwrite elite performance was entrusted to the 'technical experts' of that time; the notion of a coaching process was largely ignored and the dissemination of high end knowledge was far from complete. Unfortunately, with very little guidance the advancement of a process for coaching development fell in the same manner as the participation programs and became reliant on unqualified practices, a piecemeal approach to knowledge distribution and an ambitious dependency on Telford's "overflow effect" (1982).

This elite performance driven interpretation of coaching certainly dwarfs, and is contrary to, the fundamental practices that sustained early community orientated coaching development programs. While the likes of Telford championed community programs as the mechanism to distribute and develop enhanced coaching practice, there was very little support given to the service providers afforded the responsibility of distributing and developing these knowledge structures. Without the regulation of a higher ordinance, these community orientated programs were often operated on a shoestring budget and focused on a simple training methodology. Furthermore localised individuals with little more than a basic level of technical understanding of the content were afforded the responsibility of the delivering these programs.

With such polar opposite interpretations of the coaching paradigm a number of pertinent questions begin to surface regarding the matter of expert coaching practice. First, while the success of the AIS and the athletes exposed to this facility would seem to be assured by international results, how much of this success can be attributed to the coaching

learning exchange and how much of these advances in human performance can be attributed to other sources such as biomechanical and scientific surveillance? Furthermore, what have been the repercussions of Telford's performance hierarchy and specifically his dependency on the principle of overflow? Has there been a positive distribution of established coaching knowledge and has this distribution of knowledge lead to innovative practices and or the development of expertise?

According to Gilbert and Trudel (1999) in their assessment of the large scale coach education courses that espouse a performance orientated pedagogy, the needs and wants of the amateur coaches are generally neglected. With this in mind then, to what extent have the advances in coaching knowledge and practice filtered down to the lower level coaches? Alternatively, what advances have been made to identifying and developing expert coaching practice? Furthermore, how successful has the process of distributing and developing knowledge that is drawn from elite performance and controlled environments in which these athletes practice, been to the participation, development and performance coaches and their subsequent development of expertise?

While there is a plethora of sports based research regarding the social significance of sport and specifically the virtues of amateurism above professionalism, particularly in the United Kingdom (see Holt and Mangan, 2000; Green, 2004; Green and Oakley, 2001). There is only a modest body of research that analyses the social forces of politics and professionalism and how these have contributed towards the development of expert coaching practice. In the past, the process of sports coaching has been subjected to historical and comparative analyses with public schools (McIntosh, 1968; McNab, 1990;), teaching (Hendry, 1972; Anthony, 1980; Cooke, 1996; Lyle, 2002), apprenticeship schemes (Cassidy, Jones, and Potrac 2004), mentorships (Mallet, Rossi and Tinning, 2007) even social history (Mason 1989) but few consider the effectiveness or development of expert coaching knowledge and practice occurring outside the realm of formalised coaching education programs. There are even fewer examples that consider the development of coaching expertise as a product evolving in conjunction with the contextual elevation of modern sports. However, the socio-contextual work of Cusdin (1996) is a unique exception and provides much of the initial motivation for this investigation. Cusdin examined the status of sports through an allegorical lens to suggest that the spread of professionalism has contributed towards the 'coachification' of modern sports. Cusdin's position paper suggests that the importance of coaching evolved rapidly as consequence

of professionalism and as such questions the foundations from which expert coaching practice was, and still is, being identified and valued. Cusdin rightly questions this prevalent performance discourse which is currently framing expert coaching practice, by suggesting the 'coachification' of modern sports may lead to incomplete knowledge structures filtering back into coaching education programs.

This view developed by Cusdin has raised some genuine concerns, particularly with reference to the identification and determination of expertise in interceptive sports[1] coaching. Is coaching practice and coaching knowledge, each of which are subsumed under Lyle's (2002) umbrella of the 'coaching process', anything more than an ill-conceived after thought that is now being used to sustain a professional sports performance agenda? Or are they as intended, facets of a wider process that are shared and cultivated as a means of developing expert coaching practices? Furthermore are the pathways that are responsible for the identification and development of expert coaching practice at all performance levels, reflective of the widely accepted perception of the coaching process as a dynamic, socially constructed and contextually mediated process (see Woodman, 1993; Lyle, 1996; Abraham and Collins, 1998; Lyle, 2002)?

One of the driving forces behind this investigation will be a personal and professional need to examine how it is that expertise in interceptive sports coaching is identified and even qualified. At a fundamental level, the answers to these figurative question raised above can be resolved by understanding how effective we are at identifying, determining and developing expertise in interceptive sports coaching. A central requirement of this process will be to determine if the practices and knowledge structures that are representative of expert coaching practice are reflective of recent theoretical conclusions or if in fact they continue to adhere to questionable arbitrary measures and tenets of a bygone era. Subsequently, it will also be interesting to establish the role that the traditional modes of formal coach education – as the product of the aforementioned bureaucratic interventions, have played in this development of expert coaching practice. While it is not the intention of

[1] The term 'Interceptive Sports' is a relatively new term that has been associated with the study of coaching practitioners involved in sports that engage opposing teams of interacting players. The term 'Interceptive Sports' originates from a blending of 'Interactive sports', a term used predominantly by cognitive psychologists to describe sports that involve many interdependencies between players (see Hodge, Starkes & MacMahon, 2006) with 'Interceptive Action' a label used predominantly by Ecological Psychologists to describe actions that involve moving the body or an implement into a space at the right time to accomplish a task (see Davids, Savelsbergh, Bennett &Van der Kamp, 2002).

this research to pass comment on the service provided by formal coaching education programs, it seems however logical, that formal coach education be recognised as the initial point from which the arranging and dissemination of coaching knowledge and practices that lead to expertise originate.

1.3. What Brought Me To This Point?

They say there is very little to do while growing up in the country. The reality is there are many things to do to stay occupied. You can either work or play sports. For obvious reasons, I chose the latter and as a result have a myriad of childhood and teenage memories complete with tales of games, competitions and sporting tours. During my secondary education years I invested most of the summer time in competitive swimming – as a means of preparing for the oncoming winter and approaching Rugby League season; for it was the game of Rugby League that I was sure that I could carve out a successful career. However after what seemed a lifetime of training and preparing for a professional football career I inadvertently found myself in foreign territory, lying in the recovery ward of Brisbane's Holy Spirit Private Hospital. Forced to contemplate a second reconstruction, and the implications that this would have on any professional football career, the time was right for serious consideration regarding future investments in sport, recreation and life after football. Needless to say the penny dropped and I decided for the first time in my life that I would need to take my tertiary studies a little more seriously as the life of a professional footballer may not be that attainable.

After graduating from University, I again found myself in foreign territory – teaching Physical Education as an Itinerant Physical Education Teacher[2] in eleven of Queensland's rural Primary Schools. Not long after my first week of teaching primary school 'learn to swim' and 'stroke correction' classes I was approached by the President of the local amateur swimming club and asked to fill the vacant position of coach at the local swimming club. Considering my experience as a competitive swimmer, my training as a Physical Educator and my myriad of coaching experiences in Rugby League, Touch Football, Cricket and Tennis I felt that I was reasonably well qualified to accept this

[2] An Itinerant Physical Education Teacher is a Physical Education Teacher that is based at one school but required to routinely travel and deliver Physical Education programs to a number of schools.

position and began the following week as the part time coach of the Stanthorpe Amateur Swim Club. Three years later the Education Department transferred me to the Sunshine Coast and as such I thought it a good idea to trade in my part time job for a surfboard and use the spare time to pursue more leisurely activities. However, again after my first week of teaching 'learn to swim' and 'stroke correction' classes I was approached by a former International and Australian Institute of Sport coach and the then Head Coach of an elite swim club to fulfil an assistant coaching role within his club. What followed was a five year period in which I continued to teach physical education on a full time basis as well as fulfil the duties as an Assistant Coach and later Head Coach of one of the most successful swimming clubs on the Sunshine Coast: The Hill Swim Club Inc. (now the Matthew Flinders Anglican College Swim Club). Throughout this period I also managed to coach representative and club rugby league in the winter months with minimal overlapping of the two seasons, and fulfil the many extracurricular responsibilities that are attached to a Physical Education Teaching position.

During this period of time I began to seriously consider the possibility of pursuing a full time career in coaching. By default I was already fulfilling the duties of a full time swimming coach while maintaining my full time position with Education Queensland. However, it was more good luck then good management that I was able to juggle both. While I was enjoying the work it was becoming clearly evident that I would need to cease one of my two professional roles if I was to maintain any reasonable balance of life. As such I began to investigate the necessary requirements to pursue a career as a full time professional coach. After seeking the advice of more qualified coaches, I actively sought out professional development opportunities with the National Coaching Accreditation Scheme Level Two and Three coaching courses in Swimming. It was also during this period of time that the Education Department offered reoccurring opportunities for professional development in sports coaching to Queensland teachers. As a consequence I undertook a number of coaching accreditation courses in interceptive sports that rekindled a personal desire for further involvement in my first sporting love of Rugby League. However, due to an already over committed schedule, my desire to coach rugby league was limited to short term representative coaching roles.

As a swimming coach I had enjoyed noteworthy age group success with my charges succeeding at Regional, State, National and International (age group) Level. The number of my swimmers that were selected in Regional Relay teams to contest State Age Titles

and the success of these teams further highlighted the depth of my achievements. However, regardless of my success on the pool deck, it was made pertinently clear by my club, Queensland Swimming Association, Swimming Australia and the ASC that if I was to pursue a career in coaching – of any sport, I would need to acquire an even greater level of qualification. In other words, I needed to become more of an expert then I thought I was, or perhaps more of an expert then others considered me to be.

With significant enthusiasm and equally high expectations I took unpaid leave from my fulltime position as a Health and Physical Education Teacher, and registered for the first of what would prove to be three Level Two Coaching courses that were delivered and governed by the National Coaching Accreditation Scheme (NCAS). Due to geographical reasons and the fact that this particular course was attached to a National / International Conference I booked into the conference accommodation site with some expectation of harvesting a professional network of peers that would contribute towards the propagation of a budding career. While the expenses associated with attending such a course can never truly be ascertained as the subsidiary expenses that impact on your family life and fulltime career are intangible, it is fair to suggest that the cost of my involvement in this course was excessive. However, this financial burden did little to dampen my enthusiasm as I was informed the process is a necessary step in my professional development.

The course program boasted a grand list of keynote speakers, the who's who in Australian and International swimming. As a result I was quite eager to participate and engage; to listen and to learn as much as I possibly could to further my coaching career. However, it wasn't long into the conference program before I began to harbour grave concerns regarding the functional value of this coaching conference. From the point of registration it was clear that there were a wide range of coaches each with diverse backgrounds, levels of experience and coaching positions attending the same coaching course program. Furthermore, there did not appear to be benchmarks of prerequisite knowledge structures and as such I began to wonder what it was that each individual coach had hoped to achieve by attending this conference. Furthermore, with no multi-directional pathways for career development, I began to question how this coaching conference would meet the professional needs of each individual coach.

From the onset of the conference, the agenda was clear. The opening session was little more than a preamble for what appeared to be an 'old boys' network. With a captive

audience expecting an educational experience the opening session of this coaching education conference was squandered, recognising by open acknowledgement the successful applicants to Australian Swimming Coaching positions. To me the entire process appeared to be a self-fulfilling practice – ensuring that all who would be fortunate enough to attend this educational experience should be grateful of the opportunity to listen in these 'proven' experts. Beyond the opening session, my reservations concerning the nature of the learning experience were swiftly confirmed as subsequent sessions failed to deliver the content described in the coaching conference program outline.

In spite of this failure to deliver on advertised content, of primary concern to me were the lack of opportunity for shared knowledge and the guarded nature of privileged experience. Of the keynote speakers, all 'experts' of Australian swimming and swimming coaching, who were expected to present as part of their role in the course program, very few actually spoke about any aspect of their coaching process or how they accumulated the knowledge structures or developed the skill set and processes that enable them to achieve the status of expert. My concerns were further exacerbated by what appeared to be a rather narrow use of the time allocated for workshops. Rather than an interactive session that encouraged the exploration of new or revolutionary concepts or higher order discussion of program planning, these sessions were reduced to monologues used for replicating the same empirical knowledge structures that were delivered in pre-requisite coaching education courses. Furthermore these were the same empirical knowledge structures that could be found in aging textbooks. It appeared that very few of the 'experts' were willing to share any knowledge at all. Rather than sharing knowledge regarding coaching practices, coaching programs or coaching related knowledge, course participants were exposed to witty recounts of touring mishaps and tales of cooking fish in dishwashers and on car radiators. For me the workshops and interactive sessions failed to refute or confirm my growing belief that established coaches would rather maintain a belief in an esoteric coaching process, then develop a body of professional knowledge or contribute to the development of future coaches.

The final point that sealed my state of discontent and planted the seminal seeds for my critical concerns regarding Australia's coaching accreditation stratification system was a presentation from one of Australia's leading sports scientists. While I was fortunate enough to experience undergraduate and postgraduate training in biomechanics, anatomy and physiology and exercise physiology, I began to wonder how many of my conference

peers were capable of decoding the information being offered on the utilisation of human energy systems and the principles of muscular atrophy and hypertrophy. It became evident, through discussions with fellow attendees that such a verbose and scientific framework of knowledge was beyond the needs and capabilities of many of those in the audience. While I am sure that there were some in the audience that had the pre-requisite knowledge structures to make sense of and appreciate the material delivered in this presentation, I was concerned as to how this material, like much of the course program, would contribute to the development of level 2 coaches (particularly those without the preceding knowledge structures) and how course participants would demonstrate an ability to use and apply this knowledge.

Perhaps my expectations had been too high. Perhaps my personal history as a practicing educator, armed with undergraduate and postgraduate degrees in physical education and sports studies and an extensive list of coaching and other performance experiences had ensured that my expectations were unrealistic. However, a failure to mediate any discussion concerning the theoretical underpinnings supporting the coaching processes employed by these experts confirmed my views that this conference was constrained by nepotism, was little more than an exercise in revenue raising and served no greater purpose then adherence to the ASC functional coaching stratification system. It certainly didn't fulfil any idealistic notion of enhancing coaching knowledge, improving coaching practice, contributing towards a personal coaching process or contribute to the development of expertise.

Consequently after completing the course I returned home with more questions than answers. Of primary concern was determining and justifying to myself and club committee the functional purpose of the conference. This conference was completely preoccupied with isolated empirical knowledge and knowledge structures ground in high end science that was beyond the capabilities of many of the attendees. The sharing of authority's interpretations of technique was limited and far from revolutionary. Of what little information was offered as technical knowledge, it certainly wasn't any different from the content presented in the preceding AUSSWIM and Level 1 coaching education course.

My critical evaluation of this coaching education experience was confirmed when I returned home to complete the assessment task. The assessment items were the final tasks required to demonstrate participation and coaching expertise, yet these tasks had

very little to do with the information offered during the course program. The assessment tasks failed to act as a synthesising device or even require the participants to demonstrate any ability to apply the knowledge structures that had been offered during the course program. Clearly there was a mismatch pertaining to the content delivered during the course of the program and the assessment mechanisms used to determine expertise.

Even more concerning however, was that while the conference committee was keen to accept the registrations from 'Learn to Swim' coaches or what Lyle refers to as participation and developmental coaches the greater majority of the conference was directed at the performance end of the coaching spectrum. After discussing this point with other course participants it became evident that many of those that I had spoken with had no intention of climbing the performance coaching ladder but had already decided that they would remain as 'learn to swim' or participation coaches. With this in mind I began to question the value of a linear coach education paradigm. What was the point in demanding expertise in one stream of coaching (performance) if your interest area lies in another (participation or developmental)? Furthermore, what is the point to focusing fundamental coaching principles on elite performances, particularly when elite performances are far removed from the cognitive building blocks that constitute preliminary movement behaviour patterns? Ultimately however, I was most concerned about what appeared to be the fraternity's naïve assumption that the coaching knowledge structures that frame competitive swimming were complete.

For me, while the format and delivery of the coaching conference certainly raised concerns regarding a lack of educational philosophy and pedagogical practices, it was the next step in acquiring coaching expertise that I found alienating. The pathway for transition from 'Level 2 Skills Coach' to 'Level 2 Performance Coach' requires the coach to produce five individual national age finalists in a one year period. This professional hurdle clearly indicates a very limited understanding of the social and contextual constraints of coaching as a community of practice and is contrary to Telford's formula for the development of expert coaching practice (see page 12). A coach's career was effectively determined by the size of the community in which they would practice. Such a pragmatic determinant of quality fails to recognise the social, cultural and geographical implications that impact significantly on a coaches ability to perform. What consideration was there for rural community coaches, coaches in developmental programs, seasonal coaches or assistant coaches? What recognition was there for the coach whose squad are pilfered of talent by

more highly qualified or recognisable coaches? With these considerations in mind I began to seriously question the traditional definitions of expertise in coaching practice.

While my first experience with (higher order) formal coach education programs did very little for my professional development, it did provide me with some professional clarity. This experience led to such a level of discontent concerning the formal system of professional development that I turned my back on eight years of developmental and performance coaching practice and opted out of coaching competitive swimming. However, this decision and the free time that accompanied it provided me with the impetus to pursue other opportunities, namely coaching higher level Rugby League and Rugby Union. Unfortunately though, like swimming, to be awarded a coaching position of a senior team the applicant was first required to demonstrate a certain level of proficiency by quoting their National Coaching Accreditation Scheme number. This number is certification of the applicants most recently awarded and highest level of coaching accreditation. With this constraint in place I again arranged for myself to attend and complete Level Two accreditation courses in both Rugby League and Rugby Union. The Level Two Coaching Accreditation course in Rugby League involved a six day live-in camp whereby all the Level Two applicants were required to instruct twelve to sixteen year old children the basic plays and patterns of Rugby League during the course of the day, and supervise their board during the night.

While my level of dissatisfaction with this accreditation process was equal to that of the swimming coaching conference, this formal coaching education experience provided me with two new issues of apprehension. Firstly, I was immediately concerned with the process (or lack thereof) for selecting level two applicants to undertake this course. As was the case with the swimming coaching conference there appeared to be no parameters used by the course convenors to determine the quality of the level two participants. This initial apprehension was confirmed when some of the level two applicants were required to demonstrate their understanding of and ability to instruct the most rudimentary patterns and plays. The performance of some applicants would suggest that not all applicants had even a satisfactory understanding of the environmental indicators that inform a coach and a player when to engage such patterns of play. Furthermore, I was also concerned about how many of the Level Two instructors possessed the necessary knowledge of the underlying concepts that determine if a play or pattern is actually going to succeed. So

needless to say, I again completed another example of formalised, higher order coach education with few positive memories.

While my coaching experiences have provided me with immense satisfaction and fulfilment, my internal drive to grow professionally and to test myself as a performance coach was hampered by the functionalism of the system. While I have accepted my lot in life as a part time coach (a pursuit that still am actively engaged), I discovered that my coaching story is not dissimilar to many other career coaches in many other sports. Full time professional coaches from many sports are resolved to the fact that the bureaucracy of governing bodies and superstructural organisations restricts the growth of their careers. Coaches – more experienced and qualified then myself – are turning their backs on their sport because their careers are determined not by their ability to practice but rather by their outcomes which in turn are bound by the environment in which they practice and the professional community within which they operate.

While the majority of questions that I have raised here originate from my experiences while involved in a swimming coach education course, these experiences certainly aren't limited to the sport of swimming. I use this experience, as it was at this conference that I first started to question the formal processes of developing expertise in coaching practice. It wasn't until I participated in the Rugby League and Rugby Union coaching courses that I could clearly associate expertise with something other than technical knowledge. Each of the points that I have raised above can be replicated in each of the three Level 2 courses that I have completed and it is the consistency of the flaws in these developmental courses that provide the impetus for this research.

1.4. Why Is It Important?

Sport is without question one of the great cultural passions of our modern society. It is a common language that unites thousands of people, players and spectators across the globe. The myriad of physical activities that are collectively referred to as sport, or recreational activity, have contributed significantly to the establishment and maintenance of the national and cultural identity of many countries and people (Boyle, 2000). The increasing involvement of political bureaucracy in sport and the gusto with which sporting administrations have embraced globalisation are testament to this fact. Saury and

Durand, (1998) even suggest that the 'professionalisation' of performance sports and the elevation of coaching as a profession has been a direct consequence of the sporting world embracing such social processes as globalisation. This notion of professionalism infiltrating sporting environments is clearly evidenced by the involvement of both private and public sectors of society. These associations, which are most frequently recognised for their financial investment towards the preparation of athletes for elite performance, are so great that expert coaching practice is now perceived as an essential pre-requisite for athletic success (Mallett, Rossi and Tinning 2007).

While there is a plethora of science based research focusing on the performance orientated aspects (technical and tactical elements) of sports performance and coaching practice, there is very little literature that questions the empirical assumptions that maintain the popular principles that underpin expert coaching practice in interceptive sports (Côté, 1995; Lyle, 2002; Cassidy *et.al.,* 2004; Hammond, 2005; and Gilbert, 2004). Furthermore, of what little research that has been conducted in the field of coaching practice much of it is episodic and isolated (Fuoss and Troppmann, 1981), focused on physiological principles (Bompa, 1999), unproblematic and developmental in nature (Lyle, 2002). As a consequence of research endeavours similar to those listed above, coaching and academic communities alike have identified that a need exists for research that analyses how coaches acquire knowledge and transfer this knowledge into expert practice (see Lyle, 2002; Cassidy *et.al.,* 2004; Lemyre, Trudel, and Durand-Bush, 2007). Regrettably, this awakening first occurred more than twenty years ago with Werthner and Trudel (1993) suggesting that an enhanced understanding of the coaching practice is not only needed but should be reflective of the social context in which this process can operate.

With this in mind, it has become essential that we improve our understanding of the underpinning concepts that contribute towards the acquisition of expertise in interceptive sports coaching. While there has been considerable research directed at the development and acquisition of expertise in individual sports (albeit through a tenuous academic link to Kinesiology), there is very little research that addresses expertise in interceptive sports coaching. Consequently it is important that we improve our understanding of how the skills and knowledge structures that enable an interceptive coaching practitioner to perform at the level of expertise are acquired. As such, it is essential that we determine how coaching practitioners acquire the skills and knowledge structures that enable them to practice as

expert practitioners in interceptive sporting environments as opposed to expert coaching practitioners that function in individual sporting environments.

In an attempt to unearth a conceptual framework that rationalise coaching practice in the social context which it occurs, Lyle (2002) proposed three separate coaching roles, each of these roles identifies a distinctly separate coaching environment: Participation Coaching, Developmental Coaching and Performance Coaching. This conceptual framework was originally intended to serve only as an organising device, to isolate and explore the esoteric processes that define the coaching practices that are specific to certain social contexts (see Lyle, 1986). However, recognising that the second of these three coaching roles supresses his intentions Lyle elects to focus his attention on the polarity of Participation and Performance coaching.

While Lyle's conceptual framework of coaching practice clearly demonstrates the contextual differences between participation and performance coaching positions, Werthner and Trudel (1993) suggest that organisations responsible for delivering coach education programs have ignored the efforts of Lyle and his colleagues by continuing to deliver contextually inappropriate material extracted from the performance end of the coaching spectrum. Saury and Durand (1998); Gilbert and Trudel (1999); Cushion, Armour, and Jones (2003) and Lemyre, Trudel, and Durand-Bush (2007) have each supported this view by suggesting that the very research that informs coach education programs is grounded in elite performance. This very issue raises two vital yet related points of concern regarding expert coaching practice. First, one begins to question the context of material and the effectiveness of this material in developing the skill set of coaching practitioners. Finally does Lyle's model of coaching roles enhance or limit the opportunity for coaching practitioners (from all levels of his coaching spectrum) to aspire toward a high level of competency.

This notion of engaging and replicating elite or high performance practice as a means of disseminating knowledge structures and developing practice further demonstrates the significance of this project. Functionalist theory would suggest that not all members that belong to an organisation equally value all positions within that organisation. According to Talcott Parsons' theoretical model of macro-social processes, systems of social stratification (such as the hierarchical system adopted by the Australian Sports Commission for the development and education of Australian coaches) are inevitably used

as mechanisms to espouse class structure and reinforce positions of stature and functional importance (Uta, 2002). Parson's suggests that communities of practice enforce a system of social stratification to ensure that the most significant ranks are dutifully held by the most qualified personal – but yet validating the notion of 'qualified' remains unestablished. Uta (2002) suggests that Parson's model of social stratification was intended to highlight such anomalies.

While Functionalist Theory will not be used as a conceptual lens in this research, the significance of introducing Parsons' model of social stratification at this formative stage of the thesis establishes why this research is important. Parsons' model clearly demonstrates that systems of social stratification are not always the most reliable means for identifying expertise. Consequently, it is essential that the academic community recognise that existing conclusions regarding expert coaching practice born from research that has used social systems of stratification, as a means to identify research subjects may be ineffective. This point is further exacerbated by Werthner and Trudel (1993) who suggest that the notion of obtaining conceptual clarity from the practices and knowledge structures of expert coaching practitioners is fallacious as not all elite coaches can agree on the location, formation and application of knowledge structures that are most fruitful in determining quality of practice.

The intended use of expertise as a conceptual lens, serves the purpose of this study at a functional level. The very notion of expertise in coaching practice supports the underlying belief that a richer understanding of knowledge structures and process related to coaching practice is attainable and acknowledges the bureaucratic belief that formal coach education programs plays an integral role in developing higher order coaching practice. However, the contested nature of expertise also suggests that a holistic analysis of practice can only be obtained when the analysis occurs in the context of operation (Macey, 2000). While there is ample research to support Macey's argument, there is only a minimal body of research that has attempted to validate the status of 'expert' coaches and in the process clearly identify the indicators of expert coaching practice.

Norman, Eva, Brooks and Hamstra (2006), suggest that expertise in a dynamic activity such as coaching interceptive sports requires adeptness in a wide ranging spectrum of knowledge structures. Although some stakeholders of the coaching sciences may direct emphasis to one branch of knowledge ahead of others, most expert coaches should be

able to demonstrate proficiency in all domain specific knowledge areas that are associated with the coaching process (Hodges, Starkes, and MacMahon, 2006). As such it could be expected that formal coaching development strategies would contribute towards a coaching practitioner's development of, and interplay between, a wide ranging fields of knowledge structures. This research study will shed some light on the pathways – formal and otherwise, that coaching practitioner use to means of acquiring and developing the various knowledge structures and skills that lead to expert coaching practice.

In conclusion this project will address a research shortfall in the area of coaching practice and particularly the identification and determination of expertise. Of particular interest, will be hearing from expert coaching practitioners from both the Developmental and Performance Coaching spheres as to how they believe they have achieved the knowledge structures, skills and processes that have enable them to attain the position of expert coaching practitioner. Subsumed in this analysis will be an indirect investigation into the functional importance of traditional methods of coaching education, especially with regards to the hierarchical system of coaching accreditation.

1.5. Research Questions

As is often the case with research that is framed by emergent methodological design, the research questions are initially designed in the first phase of a project, but are then cultivated and refined in successive phases as defined by methodological protocol (O'Leary 2010). This process proved true throughout this project and can be evidenced in the refinement of the research questions from the proposal phase of this project to the final phase of theorising. For the purpose of writing a proposal, this researcher reflected heavily on personal involvement with postgraduate studies and practical experiences with formal coaching development programs. As a consequence of combining these personal experiences with an entry level of professional reading two overly simplistic research questions were created. These initial research questions were primarily concerned with the identification and propagation of expertise. These initial research questions were written as:

1. How is expertise in coaching practices of interceptive sports currently identified?

2. How do we use this knowledge to develop expertise in aspiring coaching practitioners?

With these two research questions at the forefront of my mind I began a more rigid review of the related literature. I soon discovered that there were two growing bodies of research that underpinned the subject matter of coaching practice. The first body of research was concerned with the sociology of a coaching process (Jones, 2000; Cassidy, Jones, and Potrac, 2004). The second body of research revolved around the determination of expertise and expert practitioners. However, the task of establishing a research platform from a review of the first body of literature proved to be deceptively complex as the bulk of research focusing on coaching practices and expertise was highly dependent on environmental context (Lyle 2002). As a result of this highly circumstantial nature of the research framing expertise in interceptive sport coaching, the notion of expertise in this area remains highly contested, as results are strongly dependent on experimental context. This point is most pertinently reinforced by Gilbert and Trudel (1999) who have identified that the needs and wants of novice coaches are generally neglected by large scale coaching education courses that reinforce the practices, and knowledge structures of a performance orientated agenda. Furthermore at the other end of the coaching spectrum, Gould et al., (1990); and Gilbert and Trudel (2006) have each established that the development of the performance coach has been equally stymied by the same community based coaching education framework that cannot further develop coaching knowledge and practices.

By analysing the second body of literature that frames expertise and coaching practice, the researcher became aware that while academics and the wider public are quick to label expertise, there is actually no consistent measure of expertise in sport coaching. Furthermore I also recognised that the field is void of any significant research that widely acknowledges a process for the determination and development of expertise in early career coaches. Clearly, the review of the literature enabled the researcher to identify a gap in the knowledge base, regarding how we identify expertise in sports coaching. As a consequence the first research question became:

1.1. How can we identify expertise in interceptive sport coaching?

Chapter three of this thesis clearly outlines that there is no professional consensus regarding expertise in sport coaching. While the related literature proposed many indicators of expertise such as time management, preparation and communication, these indicators of expertise were contextually dependent. It is Lyle's view (2002) that such indicators of expertise are not transferable to all contexts. For this reason, the researcher began to look for ways of measuring expertise that were not context dependent.

One constant theme that continued to emerge from the review of the literature was the proposal of decisions was a key performance indicator of expertise. Although the consistency of these proposals for decisions had emerged repeatedly over the last thirty years, a subsequent and fluent consideration of decisions as an indicator of expert practice had not followed. As an experienced coach and critical consumer of coaching practice, the researcher became aware that decisions and much later in the course of this project a decision making process, could potentially be used as an indicator of expertise, particularly when the context which is variable in nature was kept specific in measuring mechanisms. Although the notion of decision making had been identified in the literatures, it remains true to principles of grounded theory that the possibility of using decision making as a key indicator of expertise is reinforced within the the personal reflections of the researcher and the research process. Once again, the researcher modified the research questions to adapt to the emerging information. The researcher began to consider whether or not a decision making process could be identified and used as an indicator of expertise and more specifically, if decision making was critical during interceptive play. Hence, the next research question became:

1.2. Can we use decision making as an indicator of expertise?

Initially, these two research questions appeared too simple and consequently led the researcher to conduct a pilot study (see page 97 - 98). This pilot study was conceived to determine two points of interest: first to investigate if other indicators of expertise could be offered from the field and secondly to determine the validity of decision making as a key performance indicator of expertise. The pilot study, which entailed two semi-structured interviews with each of the two widely acknowledged high performance coach, indicated to the researcher that decision making could stand the test of further research as a key performance indicator of expertise. The pilot study results also indicated that decision making was possibly a tenable indicator of expertise. The researcher then decided to

investigate how the decisions were actually made and, more importantly, if this could be used to help develop expertise in career coaches. As a result of this process of reflection the following research questions were added:

1.3. How do these practitioners make decisions?

1.4. How can we use this knowledge to expedite the development of expertise in potential coaches?

1.6. Intended Research Outcomes

As previously demonstrated with the refining of the research questions, the research outcomes have also evolved over a period of time. As is expected with Grounded Theory, the research outcomes will be refined to reflect the research questions and research direction, which ultimately is governed by the emergence of data. However from the onset of this project, it was intended for is research to increase our understanding of expert practice in interceptive sports coaching. More specifically, this research intends to investigate how expertise in interceptive sports coaching is identified and developed. Subsequently, this research will provide some clarity regarding how coaching practitioners acquire and develop the knowledge structures, skills and processes that enable them to advance into expert coaching practitioners.

Over the last thirty years the Australian Sports Commission has implemented a hierarchical system of coaching accreditation whereby coaching practitioners are required to progress through a system of levels of accreditation to demonstrate expertise. Determining whether or not formal coaching is the most effective means of identifying and developing expertise in interceptive sports coaching is not the focus of this research. This research does not intend to analyse or pass judgement on the effectiveness of formal coach education programs. However, whilst I do not intend to pass judgement on this structure implemented by the Australian Sports Commission, I will be circuitously considering the contribution of such formal structures to the progression of expert practice. More importantly, this research intends to address two particular concerns: how can expertise be determined in the dynamic environment of interceptive sports and how expert coaching practitioners of interceptive sports develop expertise.

While this researcher acknowledges the important role that community wide, formal coach education programs have made to the development of coaching practice at a rudimentary level; the literature reviewed clearly questions the merits of such programs. Lemyer, Trudel and Durand-Bush (2007) suggest that formal coach education programs do not guarantee competency in the field. As accurate as empirical knowledge structures may be, the efforts of formal coach education programs may be rendered ineffective if coaching practitioners are unable to apply theory in practice. Côté, Salmela, Trudel, Baria, and Russell (1995), support this very point with their suggestion that coaching practitioners need the cognitive skills to adapt and rearrange various domain specific knowledge structures to meet the idiosyncratic needs of their coaching roles. Côté et al., (1995) are suggesting that domain specific knowledge is rendered useless if the coaching practitioner cannot build the 'mental bridges' that enable them to utilise the content delivered in formal coach education programs. If formal coach education is to enhance effective coaching practice, and if as suggested by Côté and Gilbert (2009) that effective practice be linked to expertise, then it can be safely assumed that these courses should provide coaching practitioners with the necessary knowledge structures and skills to attain the level of expert (if so desired) in all manner of coaching positions.

This notion of determining effectiveness lends itself directly to part of the intended research process of this study – identifying expertise. Wiman, Salmoni and Hall (2010) suggest that it is important that we develop an enhanced understanding of how coaches develop expertise so that we can provide the best training possible. Saury and Durand (1998) contend that coaching practitioners – particularly those at the performance end of the coaching spectrum, require different types of knowledge structures to those offered in formal coach education courses. While there is currently very little professional recognition of informal coach education experiences, superstructural organisations that do provide formal coach education programs must ensure that they provide scope for, and recognise, the creation of new knowledge structures and practices that evolve from the field of practice. Werthner and Trudel (2006) further stress this need for open ended knowledge structures by suggesting that current formal coach education programs proactively encourage practitioners to be passive consumers of empirical knowledge. These researchers argue that such an approach to knowledge development fails to prepare coaching practitioners for the unmediated and internal learning experiences that emerge from reflective practice. This research may highlight where and how coaching practitioners

acquire new knowledge structures or perhaps even explain how they develop innovative practice.

Finally, and possibly most importantly, this research will deliver an enhanced understanding of how expertise in interceptive sports coaching is identified, analysed and developed. The value of such an outcome is supported on two fronts. Firstly by the research of Starkes (2000), and Horton, Baker and Deakin (2005) who each suggest that current administrators cannot decode the ambiguous nature of elite performance? Secondly, by Côté, et al., (1995) who suggest that that current education programs are not only failing to recognise the relevant aspect of superior performances but also refusing to acknowledge a need for greater analysis of the cognitive processes that underpin the performance. Consequently, this research will avoid the pitfalls of earlier research agendas and search for key performance indicators that are representative of the contextual and socially mediated actions performed by coaching practitioners in their daily practice. Once these key performance indicators are identified, a conceptual model will be designed to provide insight into how coaching practitioners use the resources at hand, and the skills that they've perfected, to stay at the forefront of their field of practice. As such, these research outcomes may offer coaching education service providers with a process for more accurately identifying, explaining and developing expertise in interceptive sports coaching practice.

2. Chapter Two – Review of Related Literature

2.1. Prologue

As is mentioned on a number of occasions in the forthcoming chapters, the body of published research that comprises our understanding of coaching and its related fields of practice is a relatively short and still evolving body of knowledge. However, regardless of this timeframe there has of late, been a considerable quantity of published research that has addressed the notion of coaching or focused on one or more of the many facets of practice that constitutes coaching practice. As a consequence of this fragmented research approach, it is exceedingly difficult to completely understand the nuances that researchers have used to define a coaching practitioner, let alone an expert coaching practitioner, without first understanding the formative assumptions that have been used to define coaching practice and identify and determine an expert coaching practitioner.

Borrowing from Confucius, who suggests that if we desire effective practice in the future, we should first examine our past, it was decided that the literature review that underpins this research should reflect how our understanding of coaching practice has evolved over time. With this in mind the following review of literature has been divided into two equally important chapters. Chapter Two is specifically dedicated to the review of literature that reflects on past research of leading researchers who examined the field of coaching practice, while Chapter Three analyses the literature that focuses on more current issues of expertise and the development of expertise in sports coaching. As a consequence of this process there is a slight timeline evident in the literature used in this review.

In an effort to understand the formative assumptions underpinning the research that examines coaching practice, Chapter Two will reach back to the seminal work of arguably the most influential researcher in the field: John Lyle. As such, Chapter Two presents a review of the related literature, that that has emerged since Lyle's conference presentation in 1986 and onwards to the early 2000s. This epoch has been chosen, as it is the period in which coaching practice was primarily analysed according to the principles of a positivist

research paradigm and consequently establishes the platform from which our initial understandings about coaching practice and knowledge originate. While it could be suggested that considerable advances in understanding 'what it is' that defines expert coaching practitioners have been made of late (see Lemyre, Trudel and Durand-Bush, 2007; Rynne, Mallett and Tinning 2008; Mallett, Trudel, Lyle and Rynne, 2009; and Rynne Mallett and Tinning, 2010). It is my contention that much of this work has progressed beyond these seminal interpretations that define coaching practice to examine 'where it is' and 'how it is' that high performance coaches acquire the knowledge and skills that define their roles and as such this more recent body of research will serve a greater diagnostic role in validating conclusions that may be drawn from the data.

Chapter Three, will present a review of literature that is more current then that offered in Chapter Two. However, this division in the literature was not motivated by a currency of time, but by the theoretical perspectives of the underlying research. Chapter Three will present a review of literature that is predominantly framed by the theoretical perspectives of Interpretivism. Consequently Chapter Three will reference the recent and promising work of cognitive and ecological psychologists and is indicative of the initiatives and proposals of researchers that are willing to break away from a research framework that may have run its course.

2.2. Introduction

There have been many theories proposed of late, each attempting to explain the intricacies of expertise in sports coaching. While this literature embraces a wide variety of such theories, this review will focus on two prevalent themes that emerge repeatedly throughout the literature reviewed. These themes are: coaching practice and expertise. The first of these themes – 'coaching practice' has been divided into three equally important sub-themes that have been the main focus of researchers examining the phenomenon as a potential contributor to expertise in coaching practice. These three sub-themes include: the investigation of a 'coaching process', the determination of 'coaching effectiveness', and the construction of 'coaching knowledge structures'. The second theme addressed in this review is that of 'expertise'. While the notion of expertise is not completely independent of the previous theme it remains a consistent lens that is used in either an absolute or relative manner by researchers to qualify research participants and a

research agenda. For this reason alone, a review of the literature related to ‘Expertise’ in Coaching Practice will stand alone in chapter three.

Although the literature reviewed presents these themes in a variety of contexts, this review will primarily focus on their application towards the development of expertise in coaching practice. Ultimately this review will be used to underpin the seminal assumptions that will form the basis of this research which will examine how coaching practitioners build on their practical experiences and acquire the specific knowledge structures that enable them to achieve the level of expert coaching practitioner and enables them to practice in the realm of high performance sport.

2.3. The Coaching Process

Much of the literature available that attends to the notion of a coaching process is a developmental body of work that inevitably refers back to the seminal work by John Lyle (1986). Lyle’s interpretation will therefore feature as a framework for this short section.

The boundaries of vernacular have been pushed to the very limits by analysts trying to describe what it is that coaching represents. Researchers such as Cassidy, Jones and Potrac (2004) have highlighted the uncertainty and difficulty associated with defining the practice of coaching by suggesting that two of the most frequently employed nouns: ‘styles’ and ‘methods’ are applied incorrectly. To further illuminate this professional ambiguity Cassidy et al., (2004) offer a smattering of similar exemplars rich in coaching science that vary in definition from factual self-expression (Tinning, Kirk and Evans 1993) to instructional and managerial climates (Siedentop and Tannehill 2000). What Cassidy et al., (2004) are suggesting, is that in lieu of a definitive nexus between theoria and praxis that represents a coaching process model, practitioners are entrenching their own professional practice on gut feelings, intuition and past experiences, and ultimately promoting empirical knowledge that is at best a genus of isolated practices of specialisation.

Cross and Lyle (1999), Potrac et al., (2000), Gilbert (2002) and Lyle (2002) all reinforce this point of an imperfect history in coaching research. One that is rife with conflation between coaching and teaching and as such harbours a predisposition for inquiry bound

by ‘Training Theory’ (Avalos, 1991). This primacy for training theory has indirectly led to a myriad of coaching practice dichotomies. The most obvious of these dichotomies; a technical versus tactical assumptions, is fuelled by a dialectic exchange between subsets of specialisation within the coaching fraternity. This contestation between subsets has all but resulted in a research movement that espouses a narrow and overly simplistic interpretation of coaching.

Rather then add to this already sizable body of research entrenched in behavioural psychology and the performance science, Cushion et al., (2006) and Cushion and Lyle (2010) have called for changes. Both Cushion et al., (2006) and specifically Lyle and Cushion (2010) have argued that this professional vacuity has resulted because of the inherent complexity of coaching practice and as such the profession has been left without a noticeable suite of concepts or principles that duly define and develop the processes of coaching practice. A comparative analysis with other facets of the sports performance paradigm supports this fact by suggesting that there is only a modest body of professional research that examines the fundamentals of sports coaching as a process, the volume of research espousing detached scientific and or experiential knowledge exacerbates the situation.

Lyle (1996) suggests that a failure in the past to recognize sport as a process is perhaps the most limiting aspect of coaching research. Woodman (1993) foreshadowed this by proposing the idea of a social vacuum in coaching research by identifying deficiencies that are representative of inappropriate conceptual frameworks and an over-zealous attachment to quantitative research – such as measuring coaching behaviour by observation and athlete performance by scales. Woodman perceives this inclination for scientific and mathematical rigor when measuring coaching performance as an affliction on the value of social interaction and individual flair as an imperative feature in the coaching process.

Citing Dewey (1916), Strean (1995) and Schempp (1998), Potrac, Brewer, Jones, Armour and Hoff (2000) suggest that this deficiency in content relating to a coaching process is the result of a paucity of sociologically grounded research in sports coaching. It is further suggested that this lack of depth in holistic research stems from a failure to recognise the coaching role as one that goes beyond that of a technical expert. As a consequence of such an academic shortfall the business of coaching is represented by a body of

information that examines coaching as an art form (for example, Nash and Collins 2006) and consequently through an episodic lens.

This discontinuous interpretation of coaching practice also fails to enhance our professional understanding of the coaching process by highlighting short term variables that focus research attention on intervention behaviours rather than the total maintenance of the coaching process. In this instance, Cushion et al., (2006) concur with Lyle (1996; 2002) and Potrac et al., (2000) and suggest that unless coaching science embraces the notion of the coaching practice as a continuous process played out in a socially contextual world, then any research in the area will continue to be incomplete. It is evident from the literature discussed that without a thorough appreciation of coaching as a sociological process bound in practice, it becomes exceeding difficult, if not impossible to identify and analyse essential elements that will underpin the successful development of this burgeoning profession, let alone be able to identify features that can be considered as expertise.

Endeavouring to address this level of uncertainty that surrounds the notion of a coaching process, Lyle (1996; 2002) has identified a lack of operational clarity as the fundamental reason behind the inability of traditional interpretations of coaching practice to be perceived as a process. It is Lyle's suggestion that rather than develop a universal appreciation of coaching practice as a holistic process, past foray into coaching research had been narrow in focus and as such have done little more than draw attention to the contextual idiosyncrasies of the profession. As such, while previous research attempts do provide a comprehensive account of the coaching nuances within a particular focal group, such research is rendered incomplete by an inability to foster positive transfer between coaching fields and even coaching positions within the same fields. Recognising the impact of these contextual idiosyncrasies Lyle identifies a need for 'Operational Clarity' as a paramount step in instigating a unanimous interpretation of coaching as a process. To further qualify this objective, Lyle (1996 p. 16) positions operational clarity as the essential platform that is required for the development of education programs "from which ideological approaches and individual value frameworks can fashion their contextual significance".

In his quest for 'demystifying' coaching practice and assuming a certain level of cohesion of purpose in sports coaching, Lyle (2002) sets about launching this concept of coaching

as a process by identifying the generic characteristics of a process and connecting these with the conceptual frameworks that underwrite coaching practice. Similar to Woodman (1993) Lyle positions conceptual frameworks as the building blocks or discursive practices that provide the fundamentals for operational clarity. In the course of this action, Lyle identifies eight process characteristics and links each of these to eight aspects of the coaching practice paradigm. However, Lyle fails to qualify the eight process characteristics as being complete and universally accepted. By comparison with a formative review of literature in the field, Lyle also appears to be found wanting for a depth of knowledge when drawing attention to only eight elements of the coaching paradigm. Regardless of the depth of the element or number of characteristics identified, Lyle has formulated an approach that analyses the coaching process as a complex interplay of human endeavour.

Lyle (2002) reasons that by eroding the empirical canons of traditional interpretations of coaching one will have an improved capacity for identifying the conceptual frameworks that supply operational and conceptual clarity. This is achieved by addressing two fundamental questions: 'what is coaching about' and 'what makes it distinctive from other leadership roles in sporting organisations'. Lyle (2002) proposes that by addressing these two conceptual questions, researchers would be better positioned to establish conceptual clarity and therefore assert coaching as a process from the ground upwards.

Lyle's intent for establishing a platform from which a research and philosophical schema can be fashioned are well documented (see also Cassidy, Jones and Potrac, 2004; Lyle, 1999a). Moreover, the aforementioned literature indicates that his method of choice for achieving this objective, namely establishing the formative frameworks for operational and conceptual clarity was a crucial component of his attempt to demystify the practice of coaching. Despite this past proclivity for such a deconstructive approach, Lyle (2002) has more recently been quick to point out the inadequacies of isolating the constituent branches of such a complex process as sports coaching. Lyle (2002) reasons that while the intent of establishing a conceptual schema is a crucial step in responding to the ambiguities of identifying a 'coaching process', one should be aware of the ease with which such an act of deconstruction has the tendency to understate or undervalue the humanistic and interpersonal phenomena that underpins social interplay.

As a consequence of Lyle's (2002) warning of the shortcomings associated with abridged and isolated interpretations of coaching practices, Cushion et al., (2006) and Lyle and

Cushion (2010) now recommend that the products of earlier research be held at face value. In light of such revelations Gordon (2009) suggest that prior to recommending models of development and best practice, new research endeavours be redirected towards a theoretical framework that recognises the contextual objectives and distinctive subjectivities of coaching practices as a means of locating a coaching process model within practice. Such a recommendation would then necessitate a comparative analysis of a comprehensive understanding of coaching practice, as determined by expectations and levels of accountability, with the essential components of a process as indispensable to identifying a coaching process that is ground in practice.

Recognising the serial nature of coaching practice and acknowledging the contribution of social interplay in determining conceptual clarity within this sequential function that is coaching practice, Lyle (2002) recommends that the basic features of any generic process would prove a suitable starting point for the extrapolation of boundary (criteria) markers as the preliminary point of a framework for establishing a coaching process from practice. However, such benchmarks must address two key issues if they are to prove truly reflective of a complete and comprehensive spectrum of coaching. Firstly, the need for an identifiable criterion that establishes the upper limits, and or, minimal requirements of coaching is essential to determining if the basic building blocks of a process are being achieved. And secondly, these criteria need to be flexible enough to identify the contextual boundaries of the coaching role.

Lyle (2002) is suggesting that by analysing coaching practice according to a set of contextually flexible boundary markers that replicate the basic features of a generic process, researchers can facilitate a deeper understanding of coaching practice as a socially governed process and in the course of this action establish a manifest system of hierarchical coaching contexts. Lyle also contests that there are two subsequent benefits to investing in such a progression. First, by analysing coaching practice according to this system of discernable touchstones the process skills that are unique to each coaching indenture are readily detectable and effortlessly transferable within coaching hierarchy and certainly across coaching disciplines. And secondly, as a result of identifying these networks of process skills Lyle has been able to partition coaching profiles into two principal subcategories: Participation Coaching and Performance Coaching.

Clearly, Lyle foresees this notion of transposable process skills for coaching as one of the fundamental components in the construction of a conceptual framework that will underwrite the supposition of a coaching process. Furthermore, this inclination for transposable process skills empowers the notion of coaching partition by producing principle subcategories, as a medium for defending a flexible conceptual framework. Lyle (2002) contends that coaching process skills are the mechanisms from which an insightful examination of coaching practice can be achieved and generate an interpretation that goes well beyond a mere narrative or the immediacy of a circumstantial and isolated act of coaching practice.

Lyle expands upon this notion, by suggesting that there are three sets of assignable coaching practice skills. Each of these skills is drawn from concurrent exemplars of the junctures within any non-specific process, and is imperative to supporting and maintaining the flexibility of the coaching process concept. These three coaching practice skills identified by Lyle include: planning skills, delivery skills and management skills. The broader relevance of these coaching practice skills is clearly demonstrated by the inclusive intentions of Lyle's spectrum orientated approach to establishing a conceptual framework of coaching as a process. Such a perception immediately serves as a means of avoiding further truncated interpretations of coaching practice by centralising research attention and in doing so attaching credibility to the analysis of coaching practice skills at all levels of the spectrum. The contextual variances in interpretation and application of these coaching practice skills reinforces Lyle's belief for coaching practice skills to be examined as both integrated components as well as constituent functions of the act of coaching if a conceptual framework of coaching as a process is to evolve.

The richness of these contextual variances demonstrated both the complexities and yet importance of establishing a universally accepted conceptual framework of a coaching process – particularly from a developmental and educational perspective. However, Lyle's (2002 p.52) intention of establishing a differentially applied model wasn't firmly acknowledged until the introduction and ensuing recognition of coaching as a collection of distinctly separate, yet equally valuable modes of operation. In light of the capricious nature of coaching environments and the variable contextual outcomes that each generates, Lyle indicates that this set of coaching practice skills be used with equal degrees of suppleness and equanimity, ensuring a holistic representation of the full width of a vocational spectrum is achieved when formulating a conceptual model of a coaching

process. Furthermore, Lyle considers this notion of a set of coaching practice skills not as an apparatus for determining coaching status but rather as a mechanism for the maintenance of a professional integrity.

While reference has already been made in this paper to Lyle's affirmation of two distinctive constructs of coaching practice, Participation Coaching and Performance Coaching. The most significant development of this conceptual framework is not the identification of two diverse arrangements of coaching, but the actualisation of coaching as a compilation of exclusively divergent forms of one (coaching) practice. Lyle (2002) clearly articulates that this conceptual framework, through the application of boundary markers and process skills, delivers an analysis of the field that reveals coaching practice as a measurable exercise. Furthermore Lyle (2002) also contends that his conceptual framework present coaching practice as a series of exclusive representations of one larger scaffold and most definitely not as sliding points on a coaching continuum as championed by Martens (2004).

Lyle's (2002 p.52) ambition for this conceptual framework to be a mechanism for 'comprehensiveness' is underwritten by the ingenuousness of the boundary markers and process skills that account for and represent all forms of coaching practice. Where traditional perspectives of coaching practice would espouse performance coaching to be the most absolute strain of the profession, Lyle's conceptual model, draws on the boundary markers and process skills to provide an explanation for all forms of coaching. Most interestingly, Lyle reinforces the research value of participation coaching and development coaching as a sub-category of performance coaching by suggesting that performances coaching as represented by representative coaches are most likely to engage in a truncated coaching practice.

2.4. Coaching Effectiveness

It is a foreseeable certainty that any research agenda that focuses on coaching, expertise and the coaching process will at some point of the process become dependent upon establishing or identifying an effective coaching process. Unfortunately however, as Côté and Gilbert (2009) suggest that in spite of 35 years of research and discussion there has been very little progress on establishing a universally accepted conceptual model that

constitutes both effective and expert coaching practice (see also Lyle, 1999). Yet, in spite of this conceptual uncertainty, researchers and coaches alike agree that a definitive interpretation of coaching effectiveness would go a long way towards a better understanding of the coaching process.

In research terms, coaching effectiveness has been engaged as a descriptor of; good practice, well organised practiced, skills orientated practice, results driven practice and even practice that entertains the athletes. However, many of the authors responsible for these examples of effective coaching practice are unable to prescribe what it is that determines one example of practice more or less effective than another. Douge and Hastie (1993), Cross and Lyle (1999) and more recently Nash and Collins (2006) have insinuated that in the majority of cases the researchers responsible for this insubstantial use of the term coaching effectiveness have done so as a consequence of using a piecemeal approach to their research. Such an approach overly simplifies the act of expert coaching into a series of independent sub-skills or micro processes. More recently, however research has attempted to rectify such flaws by retrospectively identifying conceptual clarity by comparing pre-prescribed examples of effective coaching practice to leadership, athletic and coaching experience, and skill acquisition studies (see Gilbert, Côté and Mallet 2006). Clearly this abovementioned research would suggest that there is a vocational need for a professionally agreed upon understanding that helps determine coaching effectiveness in a more factually representational manner.

Cross and Lyle (1999b) suggest that in spite of the increasing academic rigour afforded coaching practice and the subsequent literature that recognizes the need for coaching to be perceived as a multidimensional process, numerous coaching development programs continue to consciously promote episodic practice by targeting and partitioning specific components of knowledge. One explanation for this penchant of instructional based training programs would stem from the strong association between developmental initiatives and formative educational practice. This point is reinforced by the structure of the Australian Sports Commission's; National Coaching Accreditation Scheme (ASC: NCAS) level 0 and level 1 coaching accreditation programs whereby the ability to recall and apply isolated skills is quite often the key indicator of coaching performance.

Borrowing from the work of Howe (1990), Cross and Lyle (1999) further support this view by suggesting that, in spite of the mounting academic acceptance of coaching as a

dynamic process, the qualitative ambiguity of determining an individual's contribution towards the management of an entire coaching process is a major impediment to the acceptance of the coaching process concept. Furthermore, if the determination of individual contribution is confusing at the micro level what possibility is there for modelling successful practice at a macro level – for developing expertise in coaching practice? Such concerns reverberate strongly with the claims made by Lyle (1993) and Potrac et al., (2000) who suggest that determination of coaching effectiveness; and eventually the structure of coaching development programs, remain undemonstrative by the reproduction of self-serving interpretations of coaching as an esoteric process.

Howe (1990) acknowledged the difficulties of qualifying a particular coaching performance by suggesting that "no single objective measure of coaching effectiveness can be identified, which is appropriate in all coaching situations" (Howe, 1990, p.5). However in an attempt to further advance the field, it is suggested that while no universal standards for all coaching contexts exists, the underlying principles of coaching would remain the same and would therefore act as a suitable benchmark for the measurement of coaching effectiveness. It is Howe's approximation that these underlying principles would act as a medium for qualitative assurance, providing researchers and education program designers alike with the necessary tools for the determination of effective management of the coaching process.

However, if we are to adopt Howe's offering of 'underlying principles' as the yardstick for gauging effective practice, then the immediate question that demands addressing is – exactly how many and which underlying principles do we engage as a mechanism for measuring and determining effective coaching practice? Such a question though, may very well unveil a situation whereby we 'fail to see the forest for all of the trees', as the sheer volume of established principles may inadvertently cloud the process for determining effective practice. For example, Gould, Giannini, Krane and Hodge (1990) found that 54% of the 130 American National, Pan American and Olympic team coaches (that they investigated) did not believe that a well-defined set of concepts and principles for guiding an effective coaching process existed. Of greater concern is the fact the majority of these 130 coaches that were questioned believed that the most valuable source for the acquisition of coaching specific knowledge was personal field experience and access to other successful coaches rather than utilising established principle. Considering the volume of principles that have been identified and publicly exalted by experts in the field

(see Lyle 1996; Rushall 1985; Bompa 1994), and in light of the aforementioned research by Gould and his colleagues (1990) and which has recently been reaffirmed by Rangeon, Gilbert, Trudel and Côté (2009) one must ask the question as to whether or not there can be a single tangible determinant for effective coaching practice.

Interestingly, Howe's (1990) research which nearly twenty years later is supported by the views of Coyle (2009) accurately alludes to the presence of numerous principles of coaching. However, the article in question only makes mention of one singular principle, a principle that is referred to as the Primary Principle of a coaching process. Howe (1990) contends that this primary principle requires the coach to embrace the role of a facilitator of the coaching process rather than act out the responsibilities of a coaching director. Such a view resonates heavily with the perceptions of former Australian Cricket Coach: John Buchanan (2008) who reduces effective coaching and the coaching process to three principles: each of which is centred on the fostering of positive relationships. Similar to Howe's (1990) notion of facilitation, Buchanan proposes the facilitation of relationships as the synthesising device for unifying his coaching principles that underlie his coaching process. Interestingly; however, Buchanan (2008) determines effectiveness by the degree to which the coaching process renders traditional coaching practice as superfluous.

Similar to Howe (1990), Sherman and Sands (1996) also offer a singular entity as a principle for effective coaching. Sherman and Sands (1996) have labelled their concept as the 'principle of consequence'; a superseding tenet from which the cornerstone of effective coaching practices can evolve. However, this perspective offered by Sherman and Sands (1996) contends that effective coaching is reliant upon perfect preparation and as such coaches should prioritise the preparation phase of the coaching process to the point of planning for each and every possible outcome for each and every intended training initiative. It was Sherman and Sand's (1996) intention that by reducing the coaching process to a singular principle: the principle of preparation, the notion of attaining a higher level of coaching effectiveness would become possible as the day to day actions of a coaching practitioner could be reduced to a series of premeditated 'cause and effect' relationships. However, this open ended approach to planning as espoused by Sherman and Sands would inevitably lead to isolated and or fragmented training episodes. While such an approach to training and game structure may prove idealistic in situations where the coach athlete ratio is low or even at parity, the task may prove unmanageable in interceptive play where multiple participants are involved in dynamic contests.

Even considering the shortcomings of the single principle approach espoused by Howe (1990) and Sherman and Sands (1996), this singular principle concept carries a familiar reverberation to a model later proposed by John Lyle in 2002. However, in response to published criticisms of a past penchant for using narrow arbitrary measures for determining effective coaching (see Bird 1978; Rushall 1980; Gordon 1983; Weiss and Friedrichs 1986; Lacy and Goldston 1990; Docheff 1990; and Douge and Hastie 1993), Lyle (2002) offers the notion of 'value-added' criteria as a concept for determining effective coaching practice. In principle, this approach intends for coaching effectiveness to be determined on the strength of whether or not value has been added to the athletes' performance. In what would appear to appease a growing research demand for sociological considerations, Lyle promotes his 'value-added' approach as a mechanism for determining effectiveness relative to contextual factors such as age, maturation, experience, and performance over time or even exposure to specific environmental constraints. Simplistic in design, and yet ambiguous by nature, Lyle contends that the 'value-added' approach provides suitable direction for the linear determination of effective coaching but also enough scope to be inclusive of the idiosyncratic nature of individual coaching environments.

In light of this review and subsequent to the acceptance of coaching as a multidimensional process, an omnipresent uncertainty begins to surface – there appears to be no universally agreed upon system for determining coaching effectiveness? To reinforce this point Lyle (1998) is quick to draw the line at semantics by suggesting that 'effectiveness' or effective coaching is not to be sold short by association with 'competent'. Cross (1999) maintains this linguistic separatism by suggesting that an understanding of the coaching effectiveness concept could not be established accurately without considering the contextual constraints that coaching practitioners negate on a daily basis. Cross and Lyle (1999) supports this position by drawing attention to the myriad of vigorous demands that arise due to the external constraints and time restrictions that ensure the coaching profession remains a challenging discipline. As such both Lyle (1996) and Cross (1999) suggest that the very dynamic nature of a coaching process would stipulate that a shallow or even naïve definition of 'coaching effectiveness' (read single principle approach) will not suffice.

Reflecting on this notion of individual coaching environments, some research circles have questioned the merit of such singular principle approaches for determining coaching

effectiveness. For example Cross and Ellice (1997) and Cross (1999) propose that due to the idiosyncratic nature of individual coaching environments, multiple principles from fields such as science, human psychology and coaching should be considered equally when determining coaching effectiveness (see also Wilmore, Costill and Kenney 2008; Abernethy, Hanrahan, Kippers, Mackinnon and Pandy 2005; Bowerman and Freeman 1991; Pyke and Woodman 1991). It is Cross's suggestion that for effective practice coaches need to be familiar with multiple areas of coaching knowledge. While preceding the work of Cross, Howe (1990) offered a similar opinion to that of Cross by suggesting that for the purposes of determining coaching effectiveness, rather than juggling a myriad of principles from any number of fields researchers could apply a system of procedural recognition and systematic classification that would consequently render all principles as belonging to one of two divergent sub-styles of the coaching process. The two mechanisms of the coaching process that Howe refers include the 'Principles of Training' and the 'Characteristics of a Coaching Philosophy'.

Lyle (1996) suggests that coaching effectiveness would be relatively easy to determine if practitioners were to operate in a constraints free environment. Ideally, if such a constraints free environment were attainable, coaching practice would be completely systematic. A methodical process based simply on information input and performance output. A performance equation determined by the monitoring of athletic accomplishment: assessment according to performance goals followed by the application of program adjustments and readjustments. However, reality is quite different and Lyle (1996) suggests that coaches, more often than not, are required to operate within discernible constraints such as operating with imperfect pre-service and in-service opportunities, time constraints and a limited awareness or even access to suitable measurement equipment for the appropriate analysis of athletes' performance. Lyle concludes by suggesting that it is this issue of controlling the many variables in interceptive sports that ensure that coaches make decisions based on feelings and intuitions that stem from a deeper understanding of multiple knowledge structures. As such the determination of coaching effectiveness cannot be determined by an explicitly systematic framework.

While clear in his estimation of an episodic approach to coaching, Cross (1999) candidly suggests that an episodic or even fragmented approach to coaching is occasionally the product of necessity as sociological constraints limit the effectiveness of a coaching process. Such constraints are clearly evident at the participation coaching level as the

athletes involved at this stage have variable degrees of exercise adherence motivation (Kirk et al., 1996). Surprisingly however, Cross referring to earlier research (1995), demonstrates that sociological constraints are just as evident at the Team Performance Coaching level with elite amateur athletes also finding it exceedingly difficult to commit the necessary investments that are required to capitalise on the benefits of a coaching program that is bound in a holistic interpretation of coaching as a process. Cross and Ellis (1995) concludes this research by claiming that Performance Coaches, like participation and developmental coaches, find it exceedingly easy to slip into a disjointed approach to coaching when sociological constraints impede the level of application, psychological commitment and expendable energy of elite amateur athletes.

Cross (1999) continues to support this notion of sociological constraints impeding the effectiveness of a coaching process by identifying external circumstances as another constraint that acts as an impediment to coaching effectiveness. Cross suggests that the management of external circumstances can certainly be magnified by the structure of the organisation entrusted to the coach. Cross and Lyle (1999) develops this perspective by highlighting the disparity between the coach of a swimming club as an organisation with multiple tiers of participants and ability levels; and that of the golf professional (read coach). The Golf Professional rarely if ever coaches more than one athlete at a time. As such the Golf Professional, by occupational expectations, has clearly a greater capacity for effectively adhering to the principles of training such as phases of a periodisation and specificity (Bompa 1999). Furthermore the Golf professional as a result of narrow external focus of attention has greater capacity to monitor such principles as individualisation with a higher degree of rapidity, which morphs as instantaneous and individualised augmented feedback (Schmidt and Wrisberg 2004). Whereas the coach of a multidimensional organisation such as a football club, may be limited to the provision of arbitrary units of result based information due to the broader demands of numerous athletes.

If the matter of coaching effectiveness is to be dealt with adequately, it is essential that any future representation of coaching effectiveness account for the myriad of concepts that frame the potential for effective practice (experiential knowledge, operational boundaries associated with dynamic coaching environments and environmental and sociological constraints). Only through such an inclusive approach can an adequate measure of coaching effectiveness be established, especially if this measure is intended to advance our professional understanding of the coaching process.

2.5. Constructing Coaching Knowledge

It is now a relatively common assertion that for the last thirty years, there has been a vast collection of published research afforded the coaching domain. The greater majority of this research can be defined by its endeavour to promote one of either three hypotheses – each attempting to elaborate upon the process of accumulating effective coaching knowledge. Côté, Salmela, Trudel, Baria and Russell (1994) have identified these principal perspectives as the sports science, sports psychology and sports pedagogy paradigms. According to Thomas (1992 cited in Côté et. al., 1994), such a mixed approach has generated a body of research that is isolating of other domains of related knowledge and practice. Woodman (1993) and Lyle (1993) concur with this perspective of a disorganised beginning by suggesting that coaching knowledge, as a specific domain of research, has not benefited from research streams that have emerged from both the scientific and educational locales. Consequently, Côté and his colleagues would suggest that the professional integrity of this emergent profession has been constrained by a number of inherent conjectural research impediments.

In light of this unsystematic introduction into the sphere of coaching knowledge a formative review of mainstream literature has exposed four principal points that continue to constrain the discovery and development of coaching knowledge. These impediments include concerns with the practicalities of past research in coaching knowledge; concerns with the dissemination of coaching knowledge through formalised coaching education programs; concerns regarding the determination of expertise in coaching knowledge and concerns regarding the potential (or lack thereof) of canonised knowledge structures to adapt to the contextual constraints of inimitable coaching environments. Each of these four points of apprehension will be examined with the intention of guiding future research that intends to reveal how coaching knowledge structures can be identified and how best these structures can be distributed.

2.5.1. Practicalities of Past Research in Coaching Knowledge

Sporting administrators and coaches are mindful of the advances that stem from research in the sport sciences and as such academics had previously turned their attention to the obscure world of coaching knowledge structures. As a consequence of this academic and political attention, coaching has become a rapidly evolving profession and a subsequent vehicle for phenomenological research (Woodman, 1993). Saury and Durand (1998) agree with such a view by suggesting that the inferred benefits of elite competition and the intricate requirements of preparing high performance athletes has ignited the demand for a greater understanding of the knowledge bases that underpin the coaching process and ultimately determine effective coaching. This point is reinforced in Australian terms at least, by the Commonwealth Government of Australia's new Sport Policy in 2001. Titled 'Backing Australia's Sporting Abilities: A More Active Australia' (BASA) (2001), one of the four themes within this document reasoned that Australian sporting performances would benefit from a better understanding of the coaching skills and domain specific knowledge that underwrites elite performance. As such the challenge was set, again in Australia at least, to construct a rational approach to developing a modus operandi for effective coaching practice.

As an emerging and relatively unbridled research area, many of the investigative processes that examined coaching knowledge have adopted a linear approach of analysis. Côté, Salmela, Trudel, Baria and Russell (1995) put forward that one of the underlying reasons for many researchers engaging a logical approach to unearthing the esoteric tenets of coaching knowledge was simply an organisational yearning for structure. This fascination with structure is traditionally driven by two strains of thought. Firstly, identifying structure is a conventional means of satisfying a knowledge vacuum and secondly, it is through structure that organisations can create a procedural yardstick for determining and monitoring performance (Csikszentmihalyi, Rathunde and Whalen, 1993 cited in Côté et al. 1995). Justifiably, a rapid understanding of coaching knowledge structures and a schematic approach to determining coaching effectiveness was too appealing. As a consequence of this research approach, the product (research outcomes) became a means to an end, rather than the compilation of a comprehensive understanding of coaching knowledge. Therefore without an order of precedence for comparison, sporting organisation, and academics alike, blindly followed the lead of early research that

delivered a structured account of the desired content, albeit a small and two dimensional aspects of coaching knowledge paradigm.

Côté et al., (1995) further advance their suggestion of a displaced research paradigm by insinuating that the original agenda is flawed by the vast array of conceptual models used to initially frame research endeavours. Côté and his colleagues' are suggesting that our existing understanding of coaching knowledge structures is impaired by the subjective nature of contesting research outcomes. It is Côté et al., (1995) opinion that a complete and inclusive representation of coaching knowledge is currently untenable due to the multitude of conceptual models that have been engaged in research frameworks. Arguably, much of what we believe about coaching knowledge has evolved through research that juxtaposes coaching practice with extraneous conceptual models such as those applied to education (Tinning 1982), leadership studies (Chelladurai 1984; Smoll and Smith 1984); organisational strategies (Gould, Hodge, Petersen and Giannini 1989) and vocational demands (Taylor 1992). As a consequence, the extent of our understanding of coaching knowledge is little more than a contested melting pot of frameworks each of which presents a shallow and biased perspective of coaching practice. Côté et al., (1995) concur with such a view point by suggesting that without a generic model defining coaching practice, the knowledge assembled through research remains detached information that correlates only to how and why coaches practice.

Lemyre, Trudel and Durand-Bush (2007) maintain a similar viewpoint regarding the inabilities of earlier research methods to provide an accurate representation of the coaching knowledge structures. Similar to Côté, Salmela, Trudel, Baria and Russell (1995) Lemyre et al., (2007) suggest that early research had failed to recognise the minutiae of detail that constitute a contextual understanding of the coaching process. Lemyre and colleagues attribute the inabilities of past research to acknowledge contextual factors not to the processes of simplification or external conceptual models; however, but to a homogenous research cohort. Lemyre et al., (2007) are suggesting that a considerable research focus has been directed towards developing an understanding of how elite coaches acquire and implement knowledge. Consequently, merely a narrow interpretation of the knowledge structures that represent a wider coaching spectrum exists.

The relevance of the Lemyre et al., (2007) argument is made even more pertinent when one considers the body of knowledge that currently frames our understanding of coaching

practice. This current body of knowledge is garnished from an analogous community of coaches and has provided subsequently provided the foundations for a 'novice-expert' coaching continuum (Gilbert and Trudel 2006), that underpins many formal coaching education programs. Chi (2006) questions the value of research that is drawn from a coaching continuum as an information monopoly develops. Similarly Kaufman (2007) suggests a propensity for research that focuses on a specific domain of practice (read elite coaching) will fail to deliver a complete understanding of skill acquisition by neglecting domain-general learning mechanisms. Clearly the repeating of research outcomes from high level and complex performance coaches at an audience that practices at a rudimentary level is ignoring the fundamental principles of a sequential system of education. Here Kaufman is suggesting a horse before the cart scenario. Coaching education programs that distribute content derived from the research of elite coaching environments would have little positive transfer to participation and developmental level coaching environments.

Chen et al., (2002) and Werthner and Trudel (2006) further extend upon this issue of negative transfer from an incomplete research cohort by raising apprehension regarding the determination of expertise as a point of reference. Replicating the views of Werthner et al., (2006), Wright, Trudel and Culver (2007), indicate that there is only modest agreement among established coaching practitioners concerning the value of learning sources from which elite coaches evolve and the significance of certain knowledge bases that they bring with them. Obviously this contested view of expertise would contribute significantly towards the argument proposing a disorganised and isolated body of coaching knowledge. However, while such a perspective isn't surprising, considering the disparity between individual coaching profiles, it must be acknowledged by coaching development service providers that a mutual consensus among practitioners must be established if research is to enhance the knowledge structures from which effective practice stems. Otherwise without communal recognition of how and where it is that coaches acquire knowledge, research cannot fully expect to be able to decipher the structures that underpin a coaching practitioners' skill set, let alone comprehend how this knowledge is organised and understood similarly by others.

2.5.2. Coaching Knowledge: As a Product of Formal Education Programs

Coaching by its very definition is a multifarious and complex task. Whether coaching is intended to enhance athletic performance or build on a social experience, the process is a complicated one that essentially evolves within certain social parameters. However, as indicated in sections 1.2 of the previous chapter, with increasing political interventions in sport, the notion of an amateur ethos and the role of the casual coach have both been overhauled by a bureaucratic drive for formal education and accreditation. However, in spite of more than thirty years or formalised coaching education and accreditation in Australia, there is only now a growing body of concern regarding the capacity for such prescribed processes to achieve their intended purposes and contribute towards the development of expert practice. The research of Trudel and Gilbert (2006) and Cushion, et al., (2006) reinforce this perspective by raising questions concerning the capacity of formal coaching education programs to create new coaching knowledge and practice.

Much of the argument presented by Trudel and company stems from concerns regarding the diversity of coaching environments and the inflexibility of systems of formal education. Similarly Mallett, Trudel, Lyle and Rynne (2009) and Werthner and Trudel, (2006) suggest that coaching education providers have ignored the fact that coaching is a complex and social exchange. In an unflattering assessment of formal coaching education programs, Mallett and colleagues are suggesting that some formal education and training service providers are delivering only abridged interpretations of domain specific knowledge when presenting insulated understandings of content. The relevance of this point is heightened by the fact that more often than not the information distributed in these programs are drawn from highly controlled environments and offered to coaching practitioners who may not have a grasp of underlying concepts or practice in similar settings. Bagnell (2005) adds to these concerns by suggesting that formal coaching education and training providers unwittingly ‘sell’ small and isolated structures of knowledge as acceptable representations of the larger more complex knowledge domain (see also Saury and Durand, 1998). Sadly this isn’t a unique disclosure, Côté and colleagues first stressed the relevance of poorly conceived formal education and training programs to our attention nearly twenty years ago. In their paper Côté et al., (1995) clearly suggest that detached interpretations of knowledge structures have a minimal impact on coaching performance. Clearly the deduction that must be drawn from the aforementioned research is that unless coaching practitioners have the skills to formulate mental bridges that connect knowledge structures

to action, they will be unable to reflect, self-assess, adapt and apply the disseminated knowledge.

In defence of formal coach education programs Côté et al., (1995) contends that while the content offered in formal pathways is often detached of meaning, they are well presented, rational and deliver significant chains of information. However what Côté and colleagues perceive as strength, others contend as the beginning of a larger problem. Allen (2007) for example suggests that the objectives of formal coaching education are constrained by an overly clinical representation of the complex world of coaching practice (see also Janelle and Hillman, 2003). Billett, Smith and Barker (2005) concur with such an argument by suggesting that the most likely place for legitimate learning will not be within the order of formal learning but rather in the site of pure practice – the work place. It is Allen's (2007) contention that processes engaged by formal pathways of development have innocently restricted opportunities for coaching practitioners to widen or advance existing knowledge structures by restricting the scope for application and interpretation of knowledge in practice.

With this propensity for the distribution of static tenets of elite knowledge structures, it could be insinuated that formal coaching education programs are stifling knowledge enhancement by subliminally promoting passive learners. Brown, Collins and Duguid (1989), Cushion et al., (2003) and Werthner and Trudel, (2006), each contest that the continued delivery of isolated and fragmented chunks of information, refute learners the opportunity to flexibly apply prior knowledge to solve real world problems. Lemyre et al., (2007) support this perspective by contending that formalised coaching education programs have failed to develop new coaching knowledge structures or contribute to the formation of individual coaching philosophies. It is now widely accepted that learners engaged in formal coaching education programs are simply required to absorb and regurgitate chunks of information (read knowledge structures) – regardless of their suitability to address environmental demands. Such a perception would suggest that creative problem solving and adaptive skills are currently not valued by formal coaching education programs (see Fleurance and Cotteaux, 1999; Irwin, Hanton and Krewin, 2004; and Jones and Wallace, 2005).

At the forefront of this debate for knowledge augmentation is recognition that learning is an active construction of consequences that derive from the dialectic interplay between

established knowledge structures and the reorganisation of these structures. Murphy (2007) supports such a view by suggesting that service providers who are afforded the responsibility of delivering formal education programs may want to provide greater opportunity for integrating existing knowledge structures (ideas, tools, signs, and thoughts regarding a particular topic). In a similar fashion, this is how Schempp (1993) differentiates between fact and knowledge. Schempp (1993) suggests that is facts are valued only for the means that produce them and not the ends they serve. As such we can conclude that it is the integration of knowledge with other knowledge and the contextual variability of life's experience that enables a richer interpretation of established knowledge structures or even unearthing innovative knowledge. Formal coaching education service providers that only require learners to reproduce tenets of empirical knowledge are fundamentally limiting potential for knowledge growth. A principle goal of knowledge enhancement would be to enable participants to examine their own understanding of specific knowledge structures or wider domains of knowledge with respect to those disseminated in education programs.

In a similar vein to the aforesaid knowledge enhancement debate, Nelson, Cushion and Potrac, (2006b) like Saury and Durand (1998) and Côté et al., (1995) before them, also question the ability of coaching education and training programs to generate revolutionary practice. However, unlike Côté and his colleagues, Nelson and company raise concerns regarding the appropriateness of the research supporting formal coach education services as the most appropriate means of knowledge acquisition and not specifically with the content delivered by service providers. To develop this point, Nelson et al., (2006b) declare that coaching knowledge has previously been researched at only a generalised and explicitly descriptive level. As a consequence the processes championed in formal coaching education and development programs are shallow and lacks a clear conceptual base. Lemyre et al., (2007), support such a view by identifying the United Kingdom and Canada as two leading countries that have recently responded to similar criticisms by restructuring their formal coaching education programs with the intention of providing specialised programs for each level of the coaching spectrum (Levels 1 - 5).

2.5.3. Locating Expertise for the Development of Coaching Knowledge

Academically speaking there are two dominant perspectives that attempt to explain and locate expertise. Firstly, from the field of cognitive anthropology comes the 'communities of

practice' account (Lave & Wenger, 1991). From this viewpoint expertise is socially constructed by dominant discourses or as Carter (1996) would suggest 'big personalities'. The second interpretation of expertise stems from the field of cognitive psychology and is defined by an abstract quality that represents the human capacity for adaptation when presented with extensive physical and social demands. Cognitive psychologists have provided a rudimentary offering of 10 years or 10 000 hours of exposure to deliberate practice as a benchmark for determining expertise (Ericsson et al., 1993; Allen, 2007). Yet, in spite of this arbitrary timeline and Ericsson, Krampe and Tesch-Romer notion of deliberate practice, modern sport is littered with examples of ex-players entering the ranks of elite coaching directly after retiring from playing – without the 10 years or 10 000 hours of deliberate (coaching) practice. The research of Carter and Bloom (2009) reinforces this point by identifying numerous examples of players who have made an immediate transition from elite playing ranks to elite coaching – with mixed results.

When one considers the subjective nature of expertise and the loopholes evident in cognitive psychology's parameters for expertise, the urgency for determining coaching expertise is paramount, particularly if expertise is the staff of knowledge. Côté et al., (2009) have supported such a view by arguing that as a field of research, coaching expertise has been stymied by an ambiguous framework for determining expertise. While the last 35 years of research into coaching expertise has enhanced the field, the research of Saury and Durand, (1998) and Housner and French (1994) would suggest that there was still some degree of 'ambiguity' concerning expertise and coaching practice some twenty years later. This argument of ambiguity can only add confusion to the process of determining expertise and developing coaching knowledge. Without a framework of conceptual clarity the profession runs the risk of promoting incompatible paradigms of coaching expertise and ultimately offering content in formal coaching education programs that may well be little more than a 'noble lie'[3].

A great deal of this ambiguity can be attributed to the types of knowledge sets engaged in coaching research and subsequently endorsed in coaching education and training courses. Citing research from Salmela, Russell, Côté and Baria (1994) that examined the content and structure of elite coaching knowledge, Saury and Durand, (1998) propose that

[3] The term 'Noble Lie' is a label borrowed from Plato's text "The Republican". Plato uses the term to describe the deceitful use of knowledge and who is best served by the misuse of such knowledge.

expert coaching knowledge is made up of multiple yet interrelated knowledge sets. While there is a myriad of published research that confirms the views of Saury and company, Gamble and Blackwell (2001) suggests that such research serves little more purpose then a timeline of our evolving philosophical understandings of knowledge itself. Consequently in light of research regarding revelations concerning 'Integrated Knowledge' (see Cote and Gilbert, 2009), 'Explicit Knowledge' (see Smith, 2001) and 'Embedded and Embodied Knowledge' (see Madhaven and Grover, 1998) declarative and procedural knowledge has remained the cornerstone of coaching education and training programs in Australia since the implementation of the National Coaching Accreditation Scheme.

Declarative knowledge is the term used to describe the accumulation of a propositional network of facts that is stored in the long term memory system (Anderson, 1982). This form of knowledge is a generalised explanation of events and is broadly considered to be static in nature. Procedural knowledge is a more specific brand of declarative knowledge that has been compiled into 'chunks'[4] through a process of composition and proceduralization (Anderson, 1982). These chunks can be applied directly to a particular task more efficiently and effectively. This element of specificity has determined procedural knowledge to be described as task dependent and is often the label used to describe instinctive aspects of expertise that cannot explained by declarative processes. Ironically, in light of the solid understanding of the dynamic and contextual demands of coaching practice demonstrated by coaching fraternities, these two knowledge sets remain as the cornerstone of schematic representations of coaching practice within mainstream coaching education and training programs.

What's most interesting about Saury and Durand's examination of coaching knowledge is their reference to the relatively unexplored realm of meta-cognitive knowledge structures. Côté et al. (1995) initially raised the notion of higher level cognitive skills as key indicators of coaching expertise when it was discovered that standardised declarative and procedural knowledge typologies were found to be insufficient descriptors of the mental models used by elite gymnastics coaches. Nash and Collins (2006) suggest that much of the difficulty elite coaches have when trying to explain the reasoning behind their actions and decisions can be attributed to their inability to accurately represent meta-cognitive skills such as cognitive regulation (for example, self-critical autonomy and control of cognitive actions).

[4] While the term Chunks or Chunking is most commonly associated with motor learning research from the 1950s through to the 1990s the term has most recently been revisited by Ferrari, Didierjean and Marmeche in 2008.

Understandably, it is exceedingly difficult for coaches to describe the abstract processes of meta-cognitive initiative without a preceding conceptual framework to utilise as a reference point. Similarly Schempp (2006) suggests it is difficult for experts to discuss intelligent and intuitive decisions without first embedding one's capacity to analyse information critically with the preceding skills of focusing on the relevant, recognising the atypical and drawing inferences from this information. As such, we can begin to recognise the limits of coaching education programs, and indeed coaching research for that matter, that focuses on isolated knowledge structures as a suitable toolkit for practice in a multidimensional reality.

This argument for examining and developing meta-cognitive knowledge structures is reinforced by the all too regular offering of tacit knowledge and heuristic reasoning as the underlying explanation of the esoteric knowledge structures of elite coaching. Chi, Glasser and Farr's (1988) and Ericsson and Smith (1991) support such a view by proclaiming expertise to be demonstrated by the innate application of problem solving strategies that utilise long term memory sources to deeply analyse and instinctively interpret information at speed and monitor their own problem solving strategies. Quite clearly, if we are to accept the fact that coaching is a very complex and socially constructed process (Jones et al., 2003), then we cannot use the conceptual frameworks of linear knowledge structures (e.g. procedural and declarative) to describe the creative and highly adaptive meta-cognitive processes that elite coaches use to solve real world problems. Researchers need to understand that if they are to uncover the mystery that is tacit knowledge and heuristic reasoning, then dynamical ideologies like meta-cognitive knowledge structures may need to be explored.

A significant advantage to the argument for a meta-cognitive knowledge structure contributing towards coaching expertise is the notion that learning be viewed as a process of changing conceptions and not simply the accumulation of knowledge (Abraham et al., 1998). Werthner and Trudel (2006), describe the process of learning as an interchanging network of knowledge, feelings and other abstract qualities. These qualities represent what the coach knows on that given day, but are flexible and open enough to change when they are challenged by circumstance. While Werthner and Trudel describe this interplay of old and new knowledge structures as a cognitive structure, Côté et al., (2009) have more recently labelled their description of similar interplay of knowledge as 'Integrated Knowledge'. Regardless of the label, the fact that each of these authors suggests that the

knowledge structure guides coaching action would indicate that they are describing a meta-cognitive knowledge structure as an indicator of expertise.

2.5.4. Linking coaching knowledge and coaching environments

The link between coaching theory and coaching practice is fragile and tenuous. Chen et al., (2002) propose that this is primarily due to conventional 'piecemeal' approach for disseminating knowledge structures. These authors are suggesting that exceedingly complex and domain specific knowledge structures such as those that are usually associated with elite performance environments, are deconstructed (and decontextualised in the process) and delivered as generic concepts suitable for grass-roots coaching environments. Further exacerbating the link between coaching knowledge and coaching environments is a coaching development tends to be guided by only the most obvious and superficial knowledge concepts to represent the wider complex domains (Ericsson and Smith 1991). As a consequence of this process it well argued (see Côté et al., 1995; Campbell, Brown and DiBello, 1992; Ericcson and Smith, 1991) that coaching knowledge is disjointed and generally isolated from the contextual reality of coaching environments.

In a similar vein to Chen et al., (2002) 'piecemeal' assessment of physical education practice, Lyle (1996) suggests that a dysfunctional understanding of coaching knowledge exists and that this has been exacerbated by a fragmented approach to our analysis of coaching practice. This is hardly surprising considering what Cusdin (1996) refers to as the 'coachification' of sport and the swiftness with which this process has consumed many of our recreational and leisure pursuits. After a figurative analysis of the published research in the area, Cusdin (1996) further suggests that the evolution of coaching knowledge has been relatively unplanned and as such is an empirical response to the modernisation of sport. Again just as Physical Education practice has responded to the adjustments of dominant societal discourses, coaching knowledge has experienced an equally congruent expansion but unfortunately one that mirrors the inadvertent consequences of infrastructural demands of sporting organisations. While this sporadic progression has resulted in distinct advances in professional knowledge, for the great majority, these advances remain isolated and independent from the coaching process perspective.

Lyle (1996) supports this point by further proposing that the coaching education process has become entrenched in the continuation of common, or core, units of coaching knowledge such as technical skills, rudimentary principles and an elementary level of pedagogy. It is Lyle's opinion that current models of coaching education programs only exacerbate and reinforce the habitual discourses that shape conventional coaching knowledge by replicating chronological practice. This point is clearly reinforced by Gould, Giannini, Krane and Hodge (1990) who confirm that a substantial number of coaching practitioners in the United States have not experienced any formalised coaching education during either of the developmental or performance phases of their careers and are consequently reliant on experiential practice.

In their own review of past research, Hollembeak and Amborose (2005) concur with such a view by further suggesting that a research funnel has constrained the expansion of the profession. It is Hollembeak and Amborose's perception that the majority of published research in the field of coaching knowledge has not advanced the concept of a coaching process as intended. But rather it serves to highlight the limitations of a continued acceptance of modest interpretations of the existing (mis) understandings of coaching practice. In a somewhat pseudo-acknowledgement of the complexities of analysing coaching knowledge, research in this field has been performed from a segmented perspective that is primarily grounded in the elite sporting environment. This has resulted in volumes of contextually detached principles and theories explaining coaching knowledge and coaching practice. It is Hollembeak and Amborose's (2005) suggestion that it is this information that coaching education courses of all ability levels engage as the formwork of their pre-service and in-service programs.

To further support such an insight, both Hollembeak and Amborose (2005) and before this Lyle (1996) suggests that at a micro level, our existing knowledge base is heavily influenced by a tapering research focus. This narrowing of focus as identified by the aforesaid researchers refers to a preoccupation with the investigation of leadership styles and patterns of feedback (Hollembeak et al., 2005). The manifestation of this narrow research stream is noticeably evident in the online resources supporting the Australian coaching development program. These programs tend to openly promote content that is principally concerned with organisational stratagem and informational feedback. Each of these knowledge structures are designed to provide practitioners with a toolbox of skills for the functioning of training and instructional strategies. Unfortunately, the fact remains that

such programs continue to replicate historical knowledge structures – particularly an isolated technical knowledge base and coaching behavioural patterns that stem from elite environments. Such an educational process would certainly enhance coaching performance and ultimately athlete performance if all coaching environments were contextually identical. However, coaching environments are incredibly diverse and as such this model can only serve to perpetuate Lyle's (1996) claim of a fragmented approach to knowledge distribution.

Saury and Durand (1998) and later Jones, Armour and Potrac (2004) both add further weight to the contextually divorced nature of this narrowing research foci by suggesting that a great deal of the research findings that underwrite these coaching education programs are not being applied in practice. It is implied that while coaching practitioners are aware of such overt forms of coaching knowledge structures and how to access this information, practitioners are choosing not to on the grounds of failing to conceptualise the bridge between theoria and praxis. Jones et al., (2004) suggest that the disconnection between the theoretical achievements of research and the realities of practice has resulted in coaching knowledge remaining in principal, an implicit knowledge structure.

Citing Chi et al., (1988), Lyle (2002) identifies an inflated pragmatic disposition for domain specific technical knowledge as a determinant of coaching efficiency. Hollembeak and Amborose (2005) maintain and extend on this view by suggesting that coaching behaviour is systemic of the quality and quantity of coaching knowledge that each practitioner has at their disposal. In this instance, each of the authors is suggesting that the act of spoon feeding segments of information in development programs will ultimately fail the coaches that it is intended to serve. It is the position of these researchers that without the necessary pre-requisite knowledge to fully understand and manipulate the bio-scientific, pedagogical, psychological or technical knowledge structures, then coaching behaviour will falter as the real life coaching tasks and contextual variables fluctuate from the environmental characteristics of the original research milieu. Without the necessary knowledge structures coaches will be unable to adapt established principles and theories of coaching sciences to meet the contextual needs of their specific coaching environment.

Lyle (2002) directs some responsibility for this naive interpretation of coaching effectiveness back towards the superstructural organisations that govern the various sporting bodies by asking, "as coaching competence (read knowledge) is assumed, must

coaching effectiveness (read expertise) also be assumed" (Lyle, 2002, p. 253). Lyle is raising genuine concerns regarding the merits of a system that assumes each coach who is perceived as competent will automatically possess the competencies to be effective in an assortment of situational circumstances. Mallett and Côté (2006) support such a concern by making mention of research that acknowledges triumphant coaches who have been poorly regarded by their athletes and on the other hand highly esteemed coaches that have been relatively unsuccessful by the provisos of elite competition. Appropriately, Lyle is concerned with how responsible is the coach for athlete performance? Quite clearly, a results driven touchstone is fundamentally flawed as a determinant of knowledge by its overtly simplistic nature.

While coaching practitioners' knowledge structures and the ability to transfer this knowledge into practice are traditionally determined by illogical factors such as a win loss ratio, Gilbert and Trudel (2004) suggest that such arbitrary measures only remain in practice as there are very few other alternative measures for qualifying coaching performance. Furthermore, Mallett and Côté (2006) propose that such rudimentary systems of assessment have a higher level of consequence then just the initial flaws associated with the assumption of effectiveness. Mallet and Côté (2006) have argued that such processes have the potential for creating sectoral knowledge structures. It is Mallett and Côté's belief that certain coaching frameworks, knowledge structures and philosophies can be reinforced as appointments to elite coaching and training positions are similarly determined by such arbitrary measures as results attained in elite competition or even by the number of athletes selected into national teams. While such a system may represent experiential knowledge well, it may equally neglect more revolutionary or dynamic bodies of knowledge and coaching practices.

3. Chapter Three – Interpretivist Perspectives on Expertise

3.1. Introduction

The study of expertise has long been a challenge for academic research across a range of disciplines and more recently this includes disciplines and sub-disciplines associated with sport (Wharton and Rossi, 2014). From the fields of cognitive and behavioural psychology, the concepts of expertise and the acquisition of expert knowledge have intrigued researchers concerned with the difference in the biological capacities that appear to limit the attainment of certain physical and or cognitive tasks. This perceptible imbalance in the acquisition and maintenance of complex tasks indicates a variable in an individual's aptitude for the procurement of complex skills. It is this diversity that has provided a serviceable cornerstone for a research focus addressing optimal levels of human performance, and more recently, research targeting intervention and facilitation mechanisms that are designed to enhance the acquisition of expertise (Ericsson, 2008 and Araujo, Davids and Hristovski, 2006).

While studies concerning enhanced skill acquisition have been conducted since the turn of the twentieth century (Bryan and Harter, 1899 and Lee and Swinnen, 1993), the notion of expert performance in a sporting context didn't take-off until the involvement of Cognitive Psychology in the 1970s. Abraham, Collins and Martindale (2006) suggest that professional inquiry regarding expertise in sport has only reached prominence in the last thirty-five years. Furthermore, expertise in coaching as an offshoot of the expert sports performance paradigm has only recently moved to the forefront of this research agenda. However, a new research vein rich with interpretivist perspectives is targeting the analysis of abstract notions such as mental constructs, perceptual cognition and the coupling of perception with action and the decision making process has ensured that the notion of expertise in a sporting context has received significant attention of late (see Ericsson and Lehman 1996; Abraham, Collins and Martindale 2006; Farrar and Trorey 2008; Nash, Martindale, Collins and Martindale 2012).

3.2. Research Trends in Sport and Coaching Expertise

In light of this relatively short time span defining the examination of expertise in sport, four distinct research phases have contributed to our current understanding of expertise in a sporting and coaching context. The first of these four phases occurred prior to the 1960s. This period is easily defined by Behavioural Psychologists championing the notion of a 'Motor Program' theory (Schmidt and Wrisberg, 1998, p. 130). Motor Program theory advocated an Information Processing model that explained expertise as a tangible reduction in the time taken to complete a stimulus – response selection task (reaction time) and or a stimulus – response initiation task (movement time). Preliminary behavioural research studies within this field involved calculating the time expired in completing vocational skills such as telegraphing and typing. It was inferred that the results from these vocational research tasks would have a positive transfer into the realm of sports performance.

The impetus for the second phase of research targeting expert performance in sport stems from a professional concern by cognitive psychologists regarding the capabilities of the Information Processing model to cope with the sheer volume of possible motor programs or even generalised motor programs that are associated with an information processing theory. Hodge, Starkes and MacMahon (2006) suggest that much of the research that examined the role and contribution of such models on sporting expertise of the 1970s relied on experimental and cognitive psychology. Typical research of this period involved engaging the Expert Performance Approach (see Ericsson and Smith 1991; Tuffiash, Roring and Ericsson 2007) as a mechanism for comparing the performances of skilled athletes with less skilled athletes (novices). Research of this period was domain specific and generally involved the recall and recognition of visual information (see Farrow and Raab, 2008). A primary research objective that characterises this phase of research was a preoccupation with knowledge structures – as a means of determining if such a concept could be used as a parameter for determining expertise.

The third phase of the research agenda defining expert performance in sport is characterised by the introduction of equipment capable of tracking and recording eye movements. Vickers (1992) suggests that technological developments have contributed towards the consolidation of a perceptual-cognitive research agenda. Technological

developments in recording equipment have enabled researchers such as Raab and Johnson (2007) among others to analyse data that derives from a linking of retinal movement patterns with verbal-response recordings. Similar to the preceding research phase, this chapter of research was driven by a focus for determining the differences between expert and novice performers within specific sport domains. However, unlike the preceding phase, this research period was posthumously beleaguered by professional contention regarding the parameters used for identifying and selecting domain specific experts to be studied. Chi (2006) most pertinently supports such a stance by declaring research of this period tainted by the use of absolute and relative paradigms used for determining expertise. It is Chi's (2006) suggestion that research that qualifies expertise by absolute measures (i.e. status of position or experience) or relative measures (i.e. by comparison with non-expert coaching practitioners) should be reviewed with some level of scepticism. However, in spite of concerns regarding the locating of expertise, this period of research is strongly attributed with giving rise to the notion of Deliberate Practice (Ericsson, Krampe and Tesch-Romer, 1993).

The most recent, and still evolving, phase of research to examine and analyse the notion of expertise in a sporting context is an amalgamation of methodologies and concepts that hail from Ecological Psychology (see Davids, Button and Bennett 2008) and Dynamic Systems Theory (see Schmidt and Lee 2005; see also Nonlinear Systems Theory, Bogartz 1994). Hodge, Starkes and MacMahon (2006) concur with such an opinion by suggesting the recent emergence of associated techniques from alternate paradigms have added considerably to our understanding of influential performances in sport. A major advantage with the nonlinear paradigms is an alignment with the theoretical perspectives associated Interpretivism. This point is well reinforced by Fajen, Riley and Turvey (2008), who suggest that nonlinear paradigms have provided an opportunity for a growing body of researchers that interprets perception and action as a coupled response to task instability rather than separate entities. This notion of emergent responses evolving from a perception-action exchange is the first indication of research, which simultaneously acknowledges the interaction of both perceptual-cognitive and perceptual-motor skills. A most interesting feature to the Ecological Psychologists perspective is the suggestion that perception is not only a determining component of sports performance but also one that can be trained.

An appealing and unifying aspect of this specialist research agenda is the consideration that through a greater understanding of how it is that an expert produces and reproduces a

desirable behaviour pattern, educators would be better positioned to help develop the acquisition of these behaviours in less experienced performers. While this overly simplistic hypothesis has been a purposeful objective of many research endeavours that examine expertise, some academics are inclined to disagree with the initial supposition. Klein and Hoffman (1993) for example suggest that as tempting as the idea of functional education for fast-tracking expertise may be, there certainly isn't yet a tangible case to support such a position.

In a coaching context, the Klein and Hoffman viewpoint is well supported by academic generalisations such as maxims of practice (see Farrar and Trorey 2008), tacit knowledge structures (see Saury and Durand 1998; Berman, Down and Hill 2002) and experiential knowledge development (see Lyle 2002; Mallett and Côté 2006; Erickson, Côté and Fraser-Thomas 2007), each of which may have inadvertently placed limits on the investigative process of analysing expertise in sports coaching. As a consequence there remains academic and professional belief, albeit a contested belief, that expertise is best developed through years of exposure to rich learning episodes that derive from extensive practice experiences that in turn are conducted in contextually appropriate environments (Ericsson and Smith 1991). However, while congruent research to that of Klein and Hoffman is well supported, it would be naïve to suggest that experience equates to expertise (Ericsson and Lehmann, 1996) or that appropriately constructed programs for coaching development could not enhance the opportunity to acquire, develop or display attributes that define expert coaching practice. Whatever the case may be, Horton et al., (2005) and Tuffiash et al., (2007) are clear in their recommendation for a more comprehensive model to account for expertise?

3.3. The Involvement of Ecological Dynamics

While acknowledging the role that both behavioural and cognitive psychology has played, there is a growing concern that a lack of conceptual clarity has restricted our understanding of expertise in coaching practice (Nash, Martindale, Collins and Martindale, 2012). Moreover, Hodge, Starkes and MacMahon (2006), have suggested that a narrow appreciation of the complexities that constitute expertise has stalled the development of a professional consensus regarding expertise. Jones, Armour and Potrac (2003) concur with

this perspective by declaring that research which targets coaching practice can no longer innocently ignore the magnitude of environmental factors and the other contextual variables that encompass high performance coaching practice. A review of the literature indicates that many of the professional canons defining expertise in coaching practice, and consequently those that frame our understanding of expert coaching practice, have unintentionally distorted the boundaries for determining expert coaching practice (see Ford, Coughlan and Williams 2000; Williams, Ericsson, Ward and Eccles 2008). This issue is clearly illustrated by research, and research outcomes, that present efficient or organised coaching practice as expert practice (see Saury and Durand 1998; Berman, Down and Hill 2002). As such, it can be suggested that much of the academic argument that promotes efficient and organised practice as expert coaching practice is self-restraining. Jones, Armour and Potrac (2003) assert as much by suggesting that while the current research agenda has served its purpose in developing a comprehensive understanding of the structured tasks associated with efficient coaching practices, expertise is a complex concept and one that certainly exceeds the indicators for efficiency.

Again while acknowledging the seminal findings of early research that analysed the functional aspects of expertise in coaching practice, this review of the literature indicates that much of these endeavours, while providing the framework for better understanding general coaching practice, have failed to either locate or address the key performance indicators of expertise in coaching. Lyle (2002) suggests that such shortcomings are the direct result of an academic propensity for conflation and microanalysis. Lyle's criticism of academic conflation is grounded in a body of research that has tried to locate expertise in coaching practice by comparing coaching practice with other well established domain specific fields of knowledge. As a consequence, it is argued that our current understanding of the coaching process – particularly at the high performance end, is incomplete as the dominant research framework is bound within overtly simplistic and isolated interpretations of a complex process (Lyle 2002). Similar to the 'piecemeal approach' (see Chen, Rovegno and Iran-Nejad, 2002) used to acquire mastery of complex skills in sports coaching and physical education, Lyle suggests that past research endeavours have attempted to make sense of a complex practices by employing a process of disaggregation. Disaggregation involves isolating and focusing on individual elements of a complex practice as a means of analysing tasks or practices that initially appear too complex to understand as a whole. As such, it is Lyle's (2002) contention that engaging

such a method has resulted in little more than fragmented interpretations of a highly interactive process.

Rather than struggle for lucidity in a body of research that is already stifled by a lack of conceptual clarity, researchers aligned with Ecological Dynamics suggest that an alternate model for locating expertise in coaching practice is required (see Beilock and Carr, 2004). Rather than limiting expertise in coaching practice to the realm of high performance sport, this same body of researchers suggest that expertise in coaching may be determined by an individual's ability to receive and utilise informational cues that furnish an emergent action or response. Most interestingly, such a perspective would imply that expertise is capable of being located at each point of Lyle's conceptual framework of coaching levels. Interestingly this view shared by the aforementioned researchers is congruent with recent research recommendations offered by Ecological Psychologists (see Renshaw, Chow, Davids and Hammond, 2010). Araujo, Fonseca, Davids, Garganta, Volossovitch, Brandao and Krebs (2010) suggests that rather than attempting to extrapolate coaching expertise from domains forged from organismic asymmetry[5], coaching expertise in interceptive sports may be more effectively determined by a coaching practitioner's ability to use information and knowledge structures to inform future actions that are performed under the pressure of time constraints.

3.4. Differentiating Between Efficient and Effective Practice

Theoretically, the general purpose behind the early cognitive research paradigm was to identify the micro components (of elite performance) that mediate the processes for receiving and using informational cues, environmental or otherwise, that sustain motor behaviour. Schmidt and Lee (2005) and Feltovich, Prietula and Ericsson, (2006) each agree by suggesting that expertise, according to the cognitive research agenda, was determined by an individual's ability to process domain specific information. While this cognitive framework certainly supports the perceptual-motor program that underpins the majority of literature on expert performance in sport, it explores the concept of expertise in

[5] The concept of Organismic Asymmetry refers to an inherent research bias that seeks explanations for human performance based on internal mechanisms and referents. The argument against Organismic Asymmetry is centred on a failure to recognise contextual features of the task and the relationship that exists between the performer, the performance and the environment.

coaching entirely from a sectional viewpoint and almost exclusively from the perspective of high performance athletes. This cognitive approach is often and rightly challenged by Ecological Psychologists and Dynamic Systems Theorist, who suggest that highly complex systems like the human body and brain cannot be studied in isolation as all parts of a complex system constantly affect each other in intricate ways. Confirming the views of ecological psychologists and the likes, the research MacMahon, Helsen Starkes and Weston (2007) indicates that studying the individual aspects of the larger coaching process has failed to recognise the interplay between the various elements of this larger system (see also Jones, Armour and Potrac, 2003; Janelle and Hillman, 2003). As a consequence this research approach has resulted in an incomplete and internally disputed interpretation of expertise in interceptive sports coaching.

As a consequence of this research shortfall and by association with the elite performance paradigm, the business of expert coaching is portrayed by a body of information that examines the practice of coaching through an episodic lens. Potrac, Brewer, Jones, Armour and Hoff (2000) support such a view by suggesting that this intervallic approach has produced a knowledge predisposition, one that is indicative of a paucity of sociologically grounded research in sports coaching. These same researchers further suggest that this lack of depth in holistic research stems from a failure to recognise the coaching role as one that goes beyond that of a technical expert. Consequently a procedural orientation for interpreting coaching practice has emerged. As such this approach to unravelling the practice of expert coaching has failed to enhance our professional understanding of expert coaching practice or even identify the key performance indicators of expert coaching practice. By failing to recognise that coaching is a perpetual exchange of related information rather than a series of isolated interventions (see Lyle 1996; 2002), expertise in coaching is epitomized by numerous and contesting micro representations of equally important facets of a single process.

This demarcation of an ongoing process as a series of isolated – but sequential interventions has also earned the ire of researchers for contextual reasons. Until recently much of the research that had been conducted on coaching expertise has engaged a piecemeal approach (see Chen, Rovegno and Iran-Nejad 2002). Cross and Lyle (1999), borrowing from the work of Howe (1990) suggest that this segmented analysis has resulted in a proliferation of descriptive, and entirely superficial, representations of isolated aspects of high performance coaching. As a result, the coaching literature currently

presents a multitude of qualitative interpretations that ultimately, only serves to reinforce the well-established principles of generic processes or strategic management. Such a wealth of information has certainly helped advance the professional development of generalised coaching; however, Lyle (2002) reflecting on his own work as much as anyone else suggests that such an approach has not yet produced any perceptible understanding of what actually constitutes expertise and more specifically to this paper which behaviours are truly representative of expert coaching.

Research that adopts a piecemeal approach has a propensity for highlighting short term variables. When used to analyse expertise in coaching practice, this approach, has focused diagnostic attention on the mechanical 'know how' and intervention behaviours of coaches. Araujo, Davids and Hristvski (2006) also question such traditional research methods by suggesting that approaches such as this analyse coaching practices as if they were not grounded in a performance context. Chen Rovegno and Iran-Nejad (2002) contend that such an approach – regardless of the research goal, would fail to produce a holistic interpretation of the subject matter as many of the conclusions are built upon unqualified descriptions of human thought process – a method comprising of weak reasoning and one that is unlikely to produce conceptual clarity. Cushion et al., (2006) and Potrac et al., (2000) concur with Chen and his colleagues by declaring that unless coaching science embraces the notion of coaching as a dialectic process, one that is built on reflexivity, then any research in the area will continue to be imperfect.

This limited approach to identifying the essential elements that determine expertise in a coaching process has clouded the coaching and academic fraternity's ability to identify and agree on indicators of expertise in coaching practice. A review of literature reveals an even more disparaging picture by suggesting that a dearth of informative research stems from a poorly determined research agenda (see Jones, Armour and Potrac, 2005; Janelle and Hillman, 2003). Much of the research that has been undertaken in the last two decades of the twentieth century suggests that much of the focus is directed towards the tangible, yet still innumerable, principles often associated with other domains of expertise. With a myriad of outcomes each identifying key indicators of expertise, the field have become congested with the outcomes of microanalyses of related domains of specific knowledge.

This argument of a poorly directed research agenda is further reinforced in coaching literature that demonstrates a noticeable propensity for conflation. Lyle (2002) makes

mention of an inclination for research to explain the unknown by means of comparison with other well accepted fields of doctrine. This point is clearly reinforced by publications that boasts research outcomes from studies in coaching expertise that are linked to education (see Saury and Durand 1998; Lyle 2002; Jones 2007), leadership (Cianciolo, Matthew, Sternberg and Wagner, 2006), structure and organisation (Côté, Salmela, Trudel, Baria and Russell, 1995), experience (Chase and Simon, 1973; Horton, Baker and Deakin, 1995; Sternberg, 1997; Abraham, Collins and Martindale, 2006; Ericsson and Lehmann, 1996; Tuffiash, Roring and Ericsson, 2007) and the likes. Such a body of inimitable evidence has contributed to this conceptual uncertainty on two fronts. Firstly the sheer volume of proposed indicators of expertise is enough to suggest that professional opinion remains divided. With such a body of information to consider coaching practice and coaching education courses appear preoccupied with structure and organisational commitments that define efficiency, rather than expertise. Secondly, by the inability of such methods to explain some coaching phenomena with any more detail than that of tacit behaviour, esoteric practice and maxims of knowledge.

It is clearly evident from the literature discussed that without a thorough appreciation of coaching as an ongoing, sociological process bound in practice (and performance), it becomes exceeding difficult to analyse, identify and develop the essential elements that underpin expertise in coaching practice. Clearly past research endeavours, sociologically bound or otherwise, have been helpful for identifying independent process skills that enable coaches to efficiently negotiate the boundary markers that define their coaching roles. However the same research, or research approach, cannot be used to identify practical touchstones of expert performances in coaching (see Cushion et al., 2003). Realistically much of the research addressing expertise in sports coaching has been based on narrow assumptions of expertise. Researchers have chosen to examine high performance coaches (as determined by their coaching positions), as a determinant for expertise, to identify and better understand the process skills employed in high performance environments, rather than identify key indicators of expert performance in coaching practice. As a consequence, researchers, coaches and the general public have all contributed to the establishment of an expert coaching discourse that naively accepts experience, athlete performance, knowledge or perhaps even nepotism as the basis for discursive formations that maintain efficient practice (highly organised practice according the identifiable process skills of a greater process) as key indicators of effective practice

(see Saury and Durand, 1998; Starkes, 2000; Jones, Armour and Potrac, 2003; Horton, Baker and Deakin, 2005).

3.5. Locating the Key Performance Indicators of Expert Coaching

If as indicated above, the key performance indicators for expertise in coaching interceptive sports are restricted to exemplars of capricious actions such as behavioural intervention, formal knowledge structures or organisational skills, then researchers have contributed heavily towards a professional disservice by primarily focusing analytical attention towards the elite end of the performance coaching continuum (Lyle, 1986; Hodges, Starkes, and MacMahon, 2006). This research prevalence for high performance coaching in elite environments would imply that participation and developmental coaches are unlikely to demonstrate such subjective measures of expertise. Or alternatively their coaching environments are too variable rich to meet the needs of controlled research. Whatever the reasons, if these arbitrary measures are the benchmarks that are indicative of coaching expertise, than it appears quite naïve, and somewhat elitist, to assume that expertise cannot be drawn from coaching positions that draw a lesser public profile.

Regardless of the reasons however, and excluding the likes of Gilbert and Trudel (2001) and Lemyre, Trudel and Durand-Bush (2007) there is a noticeable void in coaching literature which draws on expertise from participation and developmental coaches of interceptive sports. This fact alone is enough to substantiate the statement that researchers do not consider that expertise can be found in these lower echelons of a coaching hierarchy. This narrow perspective of expertise has contributed significantly to the existing conundrum of a lack of research targeting expertise in the participation and developmental coaching roles. Without any significant body of research to prove otherwise this research bias suggests that our existing understanding of expertise in coaching practice is little more than a series of unqualified generalisation. This point is clearly supported by the fact that participation and developmental coaches are equally capable of providing suitable feedback and constructing efficient and well organised training episodes.

Again borrowing from the cognitive perspective, expertise in a dynamic activity such as coaching interceptive sports requires adeptness in a wide ranging spectrum of knowledge structures (see Allen 2007). This need for proficiency in multiple streams of domain specific knowledge would suggest that coaching is dissimilar to many other domains of expertise (Norman, Eva, Brooks and Hamstra, 2006). Although some authority areas of the coaching sciences may give emphasis to one branch of knowledge ahead of others, most expert coaches should be able to demonstrate proficiency in all domain specific knowledge areas that are associated with the coaching process (Hodges, Starkes, and MacMahon, 2006). Obviously however, to conduct a study of analysis that examines a coaching practitioner's ability to use and manipulate the information structures of each and every specific knowledge domain would not only prove too complicated it would also suggest that there is no interplay between domain specific knowledge areas – two issues that have hindered traditional research in this area of study. With this in mind a need exists to identify more appropriate indicators of expertise, benchmarks that will be more reflective of the processes that separate exemplars of expertise from well-ordered practice. For the purposes of locating key performance indicators of expert coaching it is the suggestion of researchers aligned with Ecological Dynamics that academics should be directing more attention towards the environmentally driven emergent actions such as responding to variable conditions or the decision making processes employed by interceptive sports players and coaches.

The profession of sports coaching is bound in the notion of developing the physical, psychological and tactical performance of participants. Although sports' coaching is a complex business, it is often described serendipitously as a result driven (determined by performance or experience) intervention program (Jones and Turner 2006). However, unlike the quantitative methods used for measuring athletic performance, the usual conceptions (see page 130) of coaching practice do not lend themselves to either the clear cut methods of quantitative measurement or for that matter the descriptive repertoire of qualitative reasoning. However, recent research has proposed the perceptual-cognitive skills of forward reasoning (Ferrari, Didierjean, and Marmeche, 2006; 2008) and anticipation (see Ferrari, Didierjean, and Marmeche, 2006; 2008; Williams, Ericsson, Ward and Eccles, 2008) as potential indicators of expertise. While both concepts certainly represent abstract notions of human phenomena, it is the product of these concepts – the decision making process, that stands as a tangible means of determining expertise (Ericcson and Lehman, 1996; Saury and Durand 1998; Jones Armour and Potrac, 2003;

Nash and Collins, 2006; and Williams, Ericsson, Ward and Eccles, 2008). Contrary to past research endeavours in coaching expertise, this perceptual cognitive perspective offers an alternate means of enquiry, either by comparison or reflective analysis for the determination of expertise.

At the heart of this perceptual cognitive perspective, is the suggestion by Calvo-Merino, Ehrenberg, Leung and Haggard (2010), that coaching expertise in interceptive sports is personified by a practitioner's ability to combine environmental cues with multiple domains of specific knowledge structures to foresee a means of achieving a common objective. Contrary to this Ecological Dynamics perspective and a primary concern undermining a strictly cognitive account of expertise is that traditional research did not uncover much of the detail that was relevant to decoding the processes used by coaches when making decisions in the 'heat of battle' (Ross, Schafer and Klein 2006; Williams, Ericsson, Ward and Eccles, 2008). It is expected that through a deeper understanding of the professional judgements that coaches use to justify their decisions one could gain a greater understanding of what it is that constitutes mastery of the coaching process. This need to understand the decision making process in the context of pressure, with ill-structured problems, multiple players and dynamic environments may subliminally provide a mechanism for determining expertise.

Support for the promotion of emergent actions to be identified as key performance indicators of expertise is not limited to the realm of ecological dynamics. A number of models and theories have previously evolved from research that has identified decisions or a decision making as a possible indicator of expertise. Models and theories such as the Recognition Primed Decision-making Model (Klein, Calderwood, and Clinton-Cirocco, 1986), the Situational Awareness Model (Endsley, 1995), the Recognition / Meta-cognition Model (Cohen, Freeman, and Thompson, 1997), Mental Model Theory (Serfaty, MacMillan, Eatin and Eatin, 1997; see also Côté, Salmela, Trudel, Baria, and Russell, 1995), Self-Organising Systems Theory (Newell, 1986) and the all-encompassing Naturalistic Decision Making theory as espoused by Klein, Orasanu, Calderwood, and Zsambok (1993), have each advocated, directly or indirectly, a greater role for decisions or a decision making process to stand as an indicator of expertise. A most interesting consistency between each of these models is that while they each consider the decisions made by practitioners as exemplars of action, it is only in the milieu of time and other contextual constraints that these actions be a determinant of expertise.

This notion of emergent actions such as decisions or a decision making as a tangible touchstone for the determination of expertise in coaching practice, has for the most part been informed by research that has attempted to isolate contributory variables to decision making. For example research efforts in this vein has discussed the individual merits of the underpinning physical and mental capabilities such as perception (see Abernathy, 1985; Ross, Schafer and Klein, 2006; Araujo, Davids, and Hristovski, 2006; Ferrari, Didierjean and Marmeche 2006; 2008), Recognition (see Ericsson and Lehmann, 1996; Gobet and Simon, 1996; Nash and Collins, 2006; Gobet and Charness, 2006), Cognition and Meta-cognition (see Saury and Durand, 1998; Jones and Turner, 2006; Ross, Schafer, and Klein, 2006; Allen, 2007), Anticipation (see Erickson, Côté and Fraser Thomas, 2007; and Williams, Ericsson, Ward, and Eccles, 2008; Farrow and Raab, 2008) and Encoding or Chunking (see Côté, Salmela, Trudel, Baria and Russell, 1995; Gobet and Simon, 1996; Ross, Schafer and Klein, 2006; and Ferrari, Didierjean, and Marmeche 2006; 2008). Very few studies have been conducted on decision making in a holistic way.

4. Chapter Four – Research Methodology

4.1. Introduction

The purpose of this chapter is to make clear the reasons for choosing my scientific research paradigm and the underlying theoretical perspectives, research methodology, research approach and methods that best support the intentions of this study. The rationale for the selection of Grounded Theory as a methodology for the current study will be explained. Furthermore, this chapter will also address and highlight the reasons why Grounded Theory – particularly a 'Straussian Interpretation' (see Stern, 1994) of Grounded Theory is both an appropriate and useful methodology for examining the process of data governed inquiry of how coaching expertise is developed in interceptive sporting environments. However, as Crotty (1998) demonstrates, a research consistency must exist between the methodology adopted by the researchers and the epistemological paradigm, the theoretical stance and methods that bind the research study. With this in mind I have opted to apply Gray's (2009) research process framework as a mechanism for justifying the selection of Grounded Theory (and the subsequent perspectives and paradigms that frame this methodology) as a more then suitable research methodology.

Gray's research framework model (2009; p. 33) is not an original initiative, in fact this model has been based on an earlier models fashioned by Crotty (1998) and Saunders, Lewis and Thornhill (2007). However, Gray offers this model as a means of demonstrating the interconnected nature of social research by working sequentially from the 'Epistemological and Ontological' component through to the 'Methods' component. While Gray built this framework for the purpose of demonstrating the connected nature of social research to novice researchers, the application of this framework outline will serve the purpose of this chapter well by demonstrating the conceptual links that connect this methodology with the researcher's theoretical perspective and epistemological stance.

4.2. Clarifying Epistemology and Ontology

Even within the corridors of academia the words ‘ontology’ and ‘epistemology’ seem to generate considerable debate. Huberman and Miles (2002) suggest that much of this contestation is driven by the interchangeable and often inappropriate use of certain terminology. Simply, the term ontology refers to the researchers’ systematic account of existence. A researcher’s ontological postulations influence the direction of their research. The underpinning ontological assumptions of a researcher determine how this person perceives the nature of form and reality and therefore what it is that can be known (Guba and Lincoln, 1998). In knowledge sharing and inquiry (research), the purpose of ontology is to ensure staunchness exists to the research traditions that are initiated at the commencement of a project. That is, an ontological perspective is a commitment to the specifications of the concepts and relationships that will frame the research project.

As indicated above, ontology is often confused with epistemology; however, unlike ontology, epistemology is concerned with knowledge and what it means to know, rather than identifying what knowledge exists. Epistemology is a branch of philosophy that considers the criteria for determining what constitutes and what does not constitute valid human knowledge. Wiersma (2000) defines epistemology as the branch of philosophy that investigates the origins and limits of human knowledge. Subsequently, the epistemological and the ontological perspectives of the researcher are the overarching circumstances that ultimately scaffold the research project and as such determine how data are collected and analysed and how conclusions are drawn. Neuman (2006) supports such a statement by declaring that the epistemology of research will provide the structure for determining how research is conducted.

Currently there are at least three dominant epistemological positions that are widely recognised by the research community (Maykut and Morehouse, 1994). The first of these ‘Objectivism’ adheres strictly to the notion that reality exists independently of conscious thought. In a manner of speaking such an epistemological perspective suggests that an objective reality exists in real life either undiscovered or undefined. As such the Objectivism Perspective is geared around the idea of uncovering an already existing truth. In contrast to ‘Objectivism’ a second perspective labelled ‘Constructivism’ suggests that truth and meaning does not exist in isolation to the real world, but rather that truth and

meaning are constructed by each individuals interactions with the real world. The third of the aforementioned epistemological perspectives is 'Subjectivism'. Subjectivism while more closely aligned to constructivism than objectivism (see Gray, 2009) suggests that the meaning of knowledge is not the product of social interaction with the lived world but rather that the meaning of knowledge is imposed on the object by the subject.

In light of the above information, it is the intention of this research project to seek and establish a contextual understanding of the interplay between two social phenomena. Add to this, a personal belief that meaning is constructed through this interplay and not discovered or imposed as suggested by Positivist and Subjectivist approaches. Then this research project is most aligned within the epistemological perspective of 'Constructivism' – albeit with an iterative and interpretive slant. As such my research obligation is to the specifications of 'relativist ontologies' (Silk, Andrews and Mason, 2005) that uphold the notion of multiple and constructed realities and the processes of inductive reasoning. By embracing and adhering to these specifications this research project will operate within a Qualitative Paradigm that commits to the concepts defining a Constructivism / Interpretivism epistemology.

4.3. Qualitative Approach

This researcher's decision to opt for the Constructivism / Interpretivism epistemological approach is borne from a philosophical belief in the constructivist framework that underlines this epistemological approach. This philosophical belief is reflective of Guba and Lincoln's (1998) account of a constructivist framework which suggests that knowledge is constructed from everyday actions and their associated meanings. This interpretation of knowledge formation ensures that the Constructivism / Interpretivism epistemology is conclusively associated with qualitative research methods. Pope (2006) further reinforces this point (and consequently justifies my decision) by suggesting that a researcher who is adopting the Constructivism / Interpretivism perspective is able to uncover a richer and more descriptive appreciation of the values, meanings and actions of the research target.

To further justify this decision for a qualitative approach and in the process explain this researcher's need for a richer and more descriptive understanding of the identification and

determination of expertise in coaching practice one needs to compare Qualitative Research with its polar opposite – Quantitative Research. Contrary to the qualitative approach, the quantitative research agenda displays a preeminent disposition for measurement, particularly the measurement of pre-selected variables for the purpose of testing hypotheses. As a consequence of this commitment to the numerical assessment of predetermined variables, the Quantitative Research agenda is often criticised for delivering a narrow focus of attention (Long, White, Friedman, and Brazeal, 2000). Gray (2009) supports such a view by suggesting that the nomothetic representations that accompany Quantitative research while accurately representing the research of fixed or even arbitrarily defined variables; they fail to provide a true representation of contested or even abstract subject matter. Conversely, the qualitative research agenda asserts primacy upon the detailed analysis of cases that evolve from within socially mediated environments (see Neuman, 2006). For this reason the researcher believes that a qualitative approach will best serve this research project.

While some social research critics – namely those with a penchant for quantitative research, proffer a lack of rigour and validity as design shortfalls of the qualitative research paradigm, these contentions will be countered in this research study by employing self-reflective criticality (Whittemore, Chase and Mandle, 2001), naturalistic generalisations and criterion sampling and data triangulation (Gray, 2009). Self-reflective criticality will ensure that internal validity is achieved by repeated checks of the researcher's interpretation of data. While generalising is often discarded by qualitative research (see Gray, 2009), the use of naturalistic generalisations will be engaged in this research project as means of maximising my theoretical approach and for the purpose of achieving external validity. While Huberman and Miles (2002) imply that naturalistic generalisations are considered intuitive and ideographic and as such weak by design, this research project rejects this notion and accepts that they are none the less an empirical approach based on direct experience. For this project, criterion sampling will be maintained by ensuring that all participants are selected according to a 5 point criterion (see page 93), and data triangulation will take the form of space and concept triangulation (again explained in depth later), whereby data are collected from multiple sites and forms of interceptive sports (two participants from each of the 3 interceptive sports).

4.4. Theoretical Perspectives of Research

This inclination for qualitative research is bound by a personal desire to interpret the actual impact that hierarchical systems of training have towards the attainment of expertise as constructed by members of a coaching community. Gray (2009) supports this proclivity for engaging theoretical perspectives from a qualitative paradigm by suggesting the strength of the qualitative research paradigm is its ability to provide complex contextual descriptions of how individual's experience a given research area. As such the theoretical perspectives of a qualitative paradigm provide detailed information about the human side of identifying and establishing expertise in coaching interceptive sports. Furthermore, rather than rejecting the anomalies associated with human diversity, a qualitative framework embraces the diverse nature of human behaviour, beliefs and emotions as a means of acquiring a richer understanding of the research subject matter. However to ensure that this research project maintains continuity it is essential that I adopt a theoretical perspective that is congruent with inductive reasoning and reflects the concepts of a Constructivist Epistemology.

The literature indicates that the foundations for the theoretical perspectives analysing the development of sports coaching are firmly entrenched in the social sciences – especially within the realms of sociology and psychology (see Faye, 1987; Patton, 1990; and Oberle, 1991). However, the notion of exploring sports coaching and the knowledge acquisition processes that support this growing profession are a relatively recent initiative that extend from, and remain embedded within, a specific body of research – namely education sciences (see Popkewicz, 1994; King, 2005). In light of this association and in regards to the subject matter of this research study I believe that the unravelling methods of 'Interpretivism' will provide a most appropriate theoretical perspective on which to base this project.

Interpretivism

Interpretivism as a theoretical perspective stands is in direct opposition to 'Positivism', the dominant epistemological paradigm of mid 1900s. Positivism is primarily focused on establishing that the social world exists externally to the researcher and that its properties can be accurately measured by direct observation (Williams and May, 1996; Crotty, 1998). Positivists sought to establish that only information that could be put to the rule of empirical

experience could be incorporated into existing knowledge structures as generalisations of scientific law. As such, Positivists would contend that empirical experience would involve the scientific collection of hard data such as facts and figures that represent shape, size, speed and the like.

'Interpretivism' however, is contrary to Positivism. Interpretivism, as a theoretical perspective, embraces the notion that 'existence and knowledge are culturally derived and historically situated interpretations of the social world' (Crotty, 1998). At its' most rudimentary level the interpretive tradition, also known as the 'hermeneutic tradition' (Guba and Lincoln, 1998), has questioned the application of the scientific method to the study of social reality. In terms of epistemological paradigms this theoretical perspective is very closely connected to Constructivism. However, Interpretivism is primarily focused on the elucidation of the socially driven interplay that exists between subjects (human beings) and objects (structures). Chia (2002) adds to this by suggesting that Interpretivism implies that the world is construed through the classification mechanisms of an individual's mind. Chia (2002) further reinforces this dynamic notion of subjectivity by suggesting that the human mind is in a constant state of evolution as it makes meaning of a constant supply of human interaction and experiences. Interpretivism asserts that the tenets of science are rather different to the foundations underpinning social reality and as such require dissimilar research methods. While the natural sciences are seeking consistencies in hard data to deduce canons or laws, the social sciences are more concerned with the ideographic picture of human interpretation.

As indicated earlier expertise under the guise of accreditation, is a social phenomenon that service providers offer as the product of attending formal coaching education programs. As indicated in chapters 2 and 3, it is wrongly assumed that coaching practitioners' acquire an enhanced level of coaching behaviour, coaching practice and coaching knowledge as they progress through the ranks of coaching award (accreditation) courses (Lyle, 1992; Trudel, Gilbert and Werthner, 2010). Furthermore, Lyle, Mallett, Trudel and Rynne (2009) suggest that sporting hierarchies are beginning to recognise some level of contention surrounding the merits of formal coach education courses by questioning whether or not situated learning experiences are to be recognised as an informal learning experience that provide an alternate pathway to expertise. However, in light of the difficulties associated with locating expertise and the contested nature of defining expert coaching practice my personal theoretical beliefs would insist that this research project focus on interpreting the

construction and applicability of contextual indicators of coaching practice and whether these indicators are the product of formal coaching education courses. With an enhanced understanding of how coaching practitioners acquire, construct, disseminate and engage certain indicators of expertise, future research may question the contribution of formal coaching education programs towards the construction of social interpretations and the attainment of such contextual phenomenon.

4.5. Research Approach

Typically, a qualitative research paradigm – especially one that appoints a constructivist approach with theoretical perspectives that stem from Interpretivism, adopts an inductive approach to reasoning. In accordance with this researchers' philosophical stance, qualitative research rightly assumes a process of inquiry that commences with the accumulation of decoded information and progresses towards a universal supposition. Plymire (2005) concurs with such a perspective by suggesting that qualitative inductive reasoning proceeds from particular facts to general principle. In accordance with the aforementioned definition, it is the intention of this research study to begin with open-ended research questions rather than with a specific theory or quantifiable hypothesis. From these broad research questions, data will be collected with the purpose of constructing theories 'in-progress' that will evolve from within contextual practice. While the notion of decisions standing as an indicator of expertise was first located in the literature, these grounded theories will emerge from the data offering insight into how it is that decision making could accurately represent expertise. Moreover in must be recognised that these grounded theories will commence as 'theories in-progress' and consequently be subject to constant change and multiple revisions as new data is collected according to the research process.

While these 'in progress' theories, or generalisations by any other name, are the product of inductive reasoning in qualitative research, it is the reasons for applying this inductive logic that best explains this chosen research process. As Plymire (2005) indicates, qualitative researchers use inductive reasoning for two interconnected purposes: maintaining a subjective interpretation of reality and for validating generalisations. Unlike positivism, qualitative research endeavours like this project are bound by a certain knowledge

scepticism that ensures that the researcher interprets the human experience of reality as a product of social interaction. As a consequence, the qualitative researcher is required to implement an extensive use of empirical methods of data collection to combat the ambiguous perspective that inevitably unfolds from the human interpretations of a subjective reality.

Inductive researchers build theories or generalisations on the basis of an organized analysis of social interaction. O'Leary (2010) adds further weight to this opinion by suggesting that the generalisations derived from inductive research can be both varied and specific as each particular research setting is predisposed to producing dissimilar conclusions. The variable outcomes that result from a qualitative analysis of a certain subject matter can present a multitude of unique interpretations of a single phenomenon. And alternatively, these outcomes can be perceived as specific by the fact that each interpretation offered provides a deep and meaningful representation of the same phenomena. As a result of this degree of particularity that is associated with inductive reasoning, the outcomes of qualitative research are often perceived as less creditable then their quantitative counterparts. It is argued that qualitative research is weaker by comparison with studies based on a deductive process of analysis as it does not reflect the same levels of methodological rigour, is prone to researcher subjectivity and is often based on limited evidence (see Crotty, 1998; Wiersma, 2000; Huberman and Miles, 2005; Gray, 2009). Plymire (2005) suggests that this disparity in validity stems from the fact that the generalisations of one inductive study may not be replicated in a wide range of different situations.

Qualitative (inductive) analysis however, is a rigorous and logical process through which data are given meaning. As such this research will embrace this diversity, as the results of qualitative research offer a more complex and more precise representation of social interactions, which itself is complex and riddled with the indefinite interaction of participants. Therefore, this research project will embrace inductive logic for two reasons. Firstly on the grounds that this process is reflective of the researchers epistemological philosophies, which offer this research study as a starting point for, further research. Finally, because inductive logic empowers the qualitative researcher to embrace, interpret and highlight the complexity of interactions between practitioners and the community at large as a feature of social reality.

4.6. Research Methodology

The qualitative agenda does not necessarily pre-empt a research study by implementing a theoretical base at the beginning of the research process. Wiersma (2000) asserts that one of the strengths of qualitative research is that a theory may evolve as the research process unfolds. Because of the contested nature of social phenomena, the qualitative process enables a theory to develop while the research process is being conducted. Furthermore the qualitative process is flexible enough to not only allow for theories to emerge but also to change, refine or even disband as the research progresses. Researchers' have labelled such situations whereby a theory develops from the data that is uncovered during the research process as 'Grounded Theory'. Neuman (2006) concurs with such an interpretation by defining the research methodology of 'Grounded Theory' as the configuration of a theory that has been grounded in the data collected.

As a methodological approach 'Grounded Theory' first emerged more than forty years ago (Glaser and Strauss, 1967). Since then Grounded Theory has been instrumental in contributing towards the professional recognition of qualitative research. While much of this professional appreciation stems from a systematic approach to research design and data analysis, Grounded Theory is most widely acknowledged for the principle of demonstrating that qualitative research is capable of generating theory (Huberman and Miles, 2002). This academic disposition for theories emerging from the data clearly identifies Grounded Theory as a non-linear methodological approach to research. However, for theories and concepts to emerge from the field, the researcher needs to formulate a symbiotic style of investigation that combines both traditional modes of analysis with introspection and intuition.

Grounded Theory offers the researcher a certain level of 'artistic licence'. Charmaz (2004) concurs by suggesting that research methods in grounded theory enable the examiner to commence the research process without a priori assumptions, hypothesis, and research questions or even be governed by what literature should lead the research process. Huberman and Miles (2002) support this view by declaring that rather than embarking on a research study with an explicitly defined theoretical principle, grounded theorists can rely on a competent level of knowledge in the subject area to support the materialization of

theoretical perspectives during the research process. It is this capacity for Grounded Theory to commence with a defined purpose, yet acceptance that this purpose may be modified or even transformed altogether that most reflect the methodological needs of this research study. While coaching practices and professional definitions of coaching expertise have been established by default, the hegemonic processes of power and position have ensured that such parameters have permeated all levels of society that are involved with interceptive sport. O'Leary's (2010) summation of the grounded theory further supports my decision to opt for this particular research methodology by suggesting that grounded theory is generally adopted by researchers who believe it is important to discard preconceived interpretations of phenomena and simply allow the data to inform the process.

While the identification of Grounded Theory as a suitable research methodology appears to have been a relatively simple and natural process, the truth couldn't be further from the mark. A review of literature on Grounded Theory demonstrates that a division currently exists in research circles regarding the academic professions' understanding and application of this research methodology. Much of this speculation stems from a divergence in how the once united co-founders of Grounded Theory: Barney Glaser and Enselm Strauss now explicate the analytical processes that underpin their interpretations of Grounded Theory. Initially unified in their efforts to create a methodology that would enable real world theory to emerge from the data, Glaser and Strauss (1967) offered Grounded Theory in 1967 as a research paradigm that integrated the inherent strengths of quantitative research with the richness that accompanies qualitative approaches (O'Leary, 2010). However, over time Strauss, in collaboration with Juliet Corbin, had reviewed and adjusted the original analytical process of Grounded Theory to such an extent that it is now argued that there are two distinct approaches to Grounded Theory.

This shift in the analytical processes of Grounded Theory is made most apparent by Glaser himself, who in *Basics of Grounded Theory Analysis* (1992) suggests that Strauss and Corbin have moved away from the emergent nature of Grounded Theory, and created an alternate research methodology. In an effort to fortify his own perspective of an alternate methodology, Glaser has labelled Strauss' interpretation of Grounded Theory as Full Conceptual Description. Yet, in spite of Glaser's attempts to authenticate the boundary of Grounded Theory, this provocative divide in the philosophical paradigms has resulted in wide spread recognition that two representations of Grounded Theory now exist. As a

consequence of these two representations, Kendall (1999) recommends that researchers now need to be clear about which approach of Grounded Theory they are using.

Much of the epistemological debate surrounding the disparities in these analytical processes is concerned with the verification of codes and determination of groundedness (see Patton, 2002). However, rather than presupposing one representation of Grounded Theory over the other, the motivation behind Kendall's recommendation is purely for reasons of validity. Kendall (1999) suggests the contradictions in the analytical processes espoused by Glaser and Strauss are glaring, and similarly Boychuk-Duchscher and Morgan (2004) have later suggested that it is the inaccurate and inconsistent application of these analytical processes that is most responsible for an erosion of Grounded Theory as a research methodology. With the cautionary advice of Kendall and colleagues firmly in mind, I initiated a comparative analysis of both the 'Glaserian and Straussian Models of Grounded Theory' (Walker and Myrick 2006, p. 549) with the intention of familiarising myself with the nuances of the analytical processes of each methodology. It stood to reason that by acquiring an informed understanding about each methodology I would be better positioned to identify the analytical process that will contribute most effectively to the research goals and objectives of my study.

As indicated above, the disconnection between Glaser and Strauss is centred on the analytical processes and to be specific has much to do with incongruent assumptions about refining and integrating codes. While both methodologies adhere to a similar research process it is the positioning of the refining and integrating devices (theoretical and axial coding) that separates the two methodologies. In Strauss and Corbin's model (1998), it is the second and penultimate phase of coding that requires the engagement of refining and integrating devices. Strauss and Corbin (1998) have labelled this step in the process as axial coding and suggest that it is a crucial to their analytical process. Axial coding has been described as the process of putting fractured data back together by making conceptual connections between categories and subcategories of codes. These connections are achieved by subjecting concepts to a specific coding paradigm – a mechanism that causes Glaser a great deal of discontent.

Glaser's dissatisfaction with Strauss and Corbin's use of a coding paradigm is twofold. Firstly, it is in Glaser's opinion that Strauss and Corbin's introduction of a new level of intervention – axial coding, is brought about by an overzealous beginning to the coding

process. Glaser (1992) who concedes that there are a number of similarities in the initial phases of both analytical approaches suggests that Strauss and Corbin have over stepped the boundaries of data analysis by dimensionalizing the properties of key concepts (and subsequently codes) in their initial phase of coding. While the Glaserian approach also dimensionalizes the properties of concepts, Glaser contends that this process should remain as a final step in the analytical process. It is in Glaser's opinions that, by prematurely qualifying the dimensions of concepts Strauss and Corbin are imposing their perceptions on the data and as such are failing to adhere to the principles of theoretical sensitivity.

The second of Glaser's concerns is a product of the first. Glaser (1992) contends that as a result of qualifying the dimensions of concepts in the early stages of the analytical process, Strauss and Corbin are impulsively imposing preconceived frameworks on the data. It is Glaser's belief that this action of inserting dimensions on the data is the first step towards forcing theory on the data set, as opposed to allowing theory to emerge from the data. Strauss and Corbin (1998) respond to such suggestions of theoretical insensitivity and forcing theory on the data by suggesting that it is for these very reasons that their second level of intervention and specifically their coding paradigm are required. Strauss and Corbin (1998) contend that axial coding and subsequently the coding paradigm ensure sensitive connections emerge from the data by focusing on three aspects of an identified concept or phenomenon.

As a result of this analysis, it is this researcher's opinion that Grounded Theory is an evolving research methodology, one that is a product of its epistemology and its history with inductive reasoning. Given the contentions in the aforesaid interpretations of grounded theory I have adopted the position of Walker and Myrick (2006). Walker and Myrick (2006) propose that Grounded Theory is borne from the interplay between the researcher and the data. It is the iterative process of the Straussian interpretation, with its repeated cycles of analysis that offers greater rigour. In discussing the differences between Glaser and Strauss, O'Leary (2010) suggests that it is not so much the differences that matter as much as the understanding of these differences.

On the strength of this analysis of the two research methodologies, I have concluded that Strauss and Corbin's approach to data analysis is most suited to research goals and objective of this project. At the heart of the research questions that frame this project is a

desire to uncover what has previously been described as esoteric process – expert coaching practice. As such it makes sense to me that Strauss and Corbin's predisposition for scientific procedure, as evidenced by axial coding and its elevated use of analytical tools such as concept models, memos, flow charts and matrices is most suited to uncovering how it is that experts practice.

4.7. Methods

4.7.1. Data Collection

Qualitative data can be extracted from a wide gamut of sources. Traditionally, the most prevalent methods for collecting qualitative data can include observations, interviews and archival analysis. However, inductive researchers are not confined to these conventional methods. Huberman and Miles (2002) suggest that qualitative researchers can elect to engage one or more of these traditional methods or adopt a mixed approach by combining these aforementioned methods with quantitative techniques such as laboratory data. In spite of this relatively malleable approach to qualitative data collection, I have opted for the use of semi-structured interviews as the primary qualitative method of data collection for this research study. Borrowing from the work of Gillham (2000), I am drawn to this decision on the grounds that interviews enable the researcher and the participant to freely discuss and express their interpretations of social phenomena. However considering the socially constructed nature of the research subject matter and the propensity for ill-conceived interviews to reproduce a hegemonic explanation of empirical knowledge, the researcher has opted to engage Gillham's (2000) guidelines for avoiding bias while conducting interviews. By adopting the following guidelines for data collection: following interview instructions; maintaining a positive rapport with all research participants; recording and coding unplanned probing questions; maintaining the sequence of questions and recording / transcribing verbatim answers and to not rephrase participant responses to attitude, interpretive or explanatory responses, the research intends to garnish a greater depth and more accurate understanding of the responses offered by research participants.

According to Tuckman (1999) an interview is an effective method for collecting information and a useful means for accessing and understanding the perceptions of participants.

Fontana and Frey (2003) support this view by declaring that “interviewing is one of the common and powerful ways in which we try to understand our fellow human beings” (p. 61 – 62). By definition then it could be suggested that interviews are used when a researchers’ is endeavouring to elicit information that can’t be observed or replicated. In this research study, interviews will be conducted to obtain information about the respondents’ beliefs, perceptions and understanding towards their formation, establishment and the engagement of their decision making processes. In addition, the interviewing process will – at the preparatory phase, act as a mechanism for overcoming the problems of bias and subjectivity by ensuring suitable sampling and data triangulation are considered.

While the strengths of interviewing as a mechanism for collecting data are numerous, the idea of using interviews as the sole method of data collection has been criticised as being a limited (Gray, 2009). Despite this however, interviewing as a data collection technique has proven to be a powerful way of helping people to make explicit things that have hitherto been implicit – to articulate their tacit perceptions, feelings and understandings (Arksey and Knight, 1999). In accord with the nature of this research, and as indicated above, the primary reason for engaging interviews as the solitary method of data collection was based on the fact that interviews will best provide access to the bedded or implicit knowledge that exist inside a participant’s head? Well planned interviews make it possible to better understand what a person knows and how it is that a person comes to know. In the context of this research, interviews may best offer access to information that is otherwise unattainable by other mechanisms of data collection.

Interviewing as a method of data collection; however, has limitations and weakness. Fontana and Frey (2003) demonstrate this point by declaring, “Interviews are a negotiated text, a site where power, gender, race and class intersect”. (p. 48). Marshall and Rossman (2010) add to this issue of limitations and weaknesses by suggesting that interviews, as a result of the personal interaction and oral exchange are prone to subjectivity and bias. Throughout this research, such concerns will be negated by employing a data collection process that relies on a single researcher conducting all of the interviews according to a semi-standardised design (see Gray, 2009). While this process alone does not guard against bias, a semi-standardised interview design in combination with self-reflective criticality will contribute towards ensuring that blatant inconsistencies in the data collection and analysis phases are avoided. The notion of subjectivity will also be overcome by

preparing – prior to the interviews taking place, for space and concept triangulation at the analytical phase of the study.

While the use of mechanisms such as criterion sampling, data triangulation and applying some protocol to the interview process will serve the purpose of debunking issues of bias and subjectivity well. Fontana and Frey (2003) suggest such methods can raise separate and yet equally valid concerns regarding the controlling role of the interviewer. Fontana and her colleague are suggesting that such a rigid approach to interviewing can often lead to negative response effects such as 'socially desirable responses' (p. 69) and communication imbalances. However, these negative concerns are generally associated with interviews of an overtly formal design. To ensure that these relatively minor flaws will not impact on this study the researcher will opt for a semi-structured design that embraces an open-ended, in-depth interview format.

4.7.2. Semi-structured Interviews: the idea of a connection

Given the qualitative nature and intentions of this research, a semi-structured interview has been identified as the technique that will most enable a greater understanding of the implicit knowledge that is embedded in the responses offered by participants. Reinforcing the suitability of this approach to primary data collection, Gray (2009) suggests that semi-structured interviews allows for the probing of views and opinions when it is likely that respondents will need to expand on their answers. Fontana and Frey (2003) extend on this point by implying that the enhanced depth of understanding drawn from semi-structured interviews is built around a human to human relationship between the researcher and the participant. To achieve an enlightened understanding of expertise in interceptive sports coaching, it is advantageous that the researcher establishes a connection or common ground with the research participants. Among other methods, Gray (2009) suggests that a researcher can attain this 'connection' by accessing the volumes of knowledge that have been learned through a review of the literature and using this knowledge in conjunction with a competent level of knowledge related to the subject area to garnish a greater understanding of participant responses.

Semi-structured interviews, otherwise known as informal or conversation interviews (see Marshall and Rossman, 2010) rely on the spontaneous generation of relational and

descriptive questions amid the natural interaction between researcher and participant. In a semi-structured interview, the researcher has a list of issues and relational questions that are to be covered, but in reality accepts that not all items may need to be raised. Further to this, the arrangement of these issues and questions may also change to more descriptive questions, depending on what direction the researcher or respondent takes the interview. Moreover, the researcher must also be cognisant of the fact that additional questions may also be required and are generated during the interview process as new issues or concepts are identified. The semi-structured interview allows for the exploration of subjective responses and opinions where it is desirable for respondents to expand upon their views. Unlike the predetermined presentation of a structured interview, the semi-structured approach enables the researcher to target and capitalise on emerging streams of content.

4.8. Data Analysis

One of the most highly regarded methods for analysing qualitative data is through content analysis. However, this system of analysis essentially involves the drawing of inferences from the data by systematically and objectively identifying characteristics, classes or categories. Gray (2009) suggests that content analysis attempts to achieve a certain level of objectivity through a process that embraces the adoption of specific rules. These specific rules are generally referred to as a ‘criteria of selection’ and are usually established prior to the analytical process commencing. However, due to the inductive nature of this research project, no a priori criteria can be assumed. This research project intends to allow for criteria to emerge through the process of data collection and analysis – rather than establishing such concepts prior to the research process commencing. As a consequence of this quest for an emerging framework the traditional method of data analysis: content analysis has been deemed too deductive to contribute towards the greater objectives of this research project.

As such, accepting Grounded Theory as a qualitative research methodology that remains at odds with the boundaries of the traditional deductive methods of data analysis, an alternative approach is required. However, recognising the cautions offered by Wiersma (2000) a move from tradition will ultimately raise further research concerns regarding the

validity of analysis. Gray (2009) supports this concern by suggesting that Grounded Theory is a highly inductive process and one that requires a constant engagement of comparative methods to explore each information source until a point of theoretical saturation (see page 90) is achieved and validity can be assured. Consequently, the question of validity concerning the use of inductive analysis of data is often raised by critics of this methodological approach but is negated by the engagement of constant comparative measures (see O'Leary 2010).

A further concern associated with this analytical shift from tradition is the use of the researchers experience in the subject area. Albeit a strength of this methodological approach, the notion of using the researcher's competent levels of knowledge in a subject area to support the materialisation of theoretical perspectives may certainly raises some concerns of trustworthiness among the wider research community (see O'Leary, 2010). To overcome these concerns regarding validity and ensure that this inductive methodological approach offers more than a static or biased analysis of the data, this research will engage an influential data analysis process that is proposed by Strauss and Corbin. Strauss and Corbin (1998) contend that through the implementation of their 'conditional matrix' the issues of validity concerning data analysis can be alleviated.

The conditional matrix is a framework encompassing three forms of coding: Open coding; Axial coding and Selective coding. These three forms of coding are pulled together as a means of identifying a 'complex web of interrelated conditions, actions / interactions, and consequences pertaining to a particular phenomenon' (Strauss and Corbin, 1998, p. 181). The conditional matrix model lends itself well to this research study as the framework is not necessarily dependent upon a systematic sequence of implementation as it is designed to reflect the researchers need to analyse data as it emerges. Strauss and Corbin (1998) suggest that this process will enable the researcher to identify the respondent's implicit meanings and decipher their assumptions regarding embedded knowledge.

4.8.1. Open Coding

Strauss and Corbin (1998, p. 62) define Open Coding as 'the naming and categorising of phenomena through the close examination of data'. Open Coding involves the use of two

analytical processes in conjunction with comparing and questioning strategies. These four strategies combine to assist with the labelling and allocating of phenomena into concepts and categories. These four courses of action include: microanalysis of the data; questioning the data for relevance to the research objectives; interim writing of the theoretical accounts and not postulating the relevance of traditional variables. Essentially these four courses of action are built upon the principle of constant comparison. Through an ongoing comparison of data the researcher is able to identify each instant a commonality or category is located within the data. Furthermore, the essence of grounded theory is reinforced in this process of Open Coding when new commonalities are discovered that do not fit an original categories, demanding a reconfiguration of the research generalisation.

The purpose of the Open Coding process is to launch categories from the data set. However Gray (2009) suggests that these categories can only be formed around reoccurring data or commonalities of data that demonstrates a consistency in the properties and dimensions define them. In the Open Coding process the concept of properties refers to the unique characteristics and or attributes of each category. The concept of dimensions operates much like a continuum and represents the notions of extent and reoccurrences. Collectively the purpose of these defining elements is the disaggregation of data into manageable units of information.

4.8.2. Axial Coding

At a most rudimentary level, Axial Coding serves the purpose of highlighting what causes the phenomenon that constitutes a category and identifying the relationships that exist between categories. Axial Coding takes the categories identified in the Open Coding process and attempts to make connections between various categories and possible sub-categories. This is achieved by exposing these categories to a coding paradigm that is specific to Strauss and Corbin's analytical process (Strauss and Corbin 1998). This coding paradigm involves an investigation of specificity, a contextual analysis; an assessment of the action interaction exchange and determination of consequences. The investigation of specificity is to establish the circumstances that induce the conditions that constitute the category. The contextual analysis is to identify the context in which the phenomena emerge. The assessment of the action / interaction exchange is to determine if the

emergent data is congruent with the research objectives. Finally, the determination of consequences establishes whether or not the actions and interactions were predictable or unanticipated. Collectively these four analytical processes combine to ensure that Axial Coding provides the researcher with a system for reorganising the relationships that exist between the research categories.

4.8.3. Selective Coding

The Selective Coding process is not too dissimilar from the previous system of coding: Axial Coding. The Selective Coding process is designed for the identification and selection of core categories from which the foundations of the generalisations that sustain a Grounded Theory can be established. In the Axial Coding process, the researcher derives a set of commonalities from that data that would constitute various categories. These categories are further defined in terms of properties (unique characteristic) or dimensions (propensity for impact and reoccurrence). Through Selective Coding, these categories are again sorted to identify only the core categories that unearth generalisations through which a story line can be established. The Selective Coding process can involve any or all of another four analytical phases, each of which can shed light on the subliminal or obvious social processes that shape and define the phenomena under investigation. These four analytical phases include: Story line formulation; networking sub-categories and core categories; validating the networks and category refinement.

Formulating a story line can take one of two forms. First, Gray (2009) suggests that by reformulating the field notes from raw data into a descriptive overview, the researcher can begin to focus on only the most salient information, allowing a story line may emerge from each of the core categories. By identifying the salient information in this descriptive overview, the researcher can begin a process of self-critical reflectivity to ensure that the most pertinent data of each core category is aligned with the research objectives. Alternatively, through this descriptive overview the researcher may identify one core category that stands alone as an abstract entity yet touches on each of the other core categories. By returning to the Axial Coding process, this isolated category may be reconfigured to encapsulate the essence of each of the other core categories and in the process produce a more apt story line that effectively encompasses all core and sub-categories.

As the label of this second process implies, the networking of sub-categories and core categories is an analytical process that ensures subsidiary categories demonstrate a valid link to other core categories. This will ensure that the subsidiary categories inform the core categories and as such contribute to the analytical interpretation of the story line. To achieve this, the process may require the researcher to revisit either, or both, the Open and Axial Coding processes. The purpose of this step in the process is to ensure that all categories attain an allegiance to the storyline. It is significantly important that during this process the researcher identifies the conceptual patterns and relationships that underpin the networking of various categories, as it is these patterns and relationships that will ultimately provide the emerging theory with specificity of data occurrence.

Validating the networking processes requires the researcher to authenticate (grounding the theory) the network relationships by revisiting the data to ensure that the story line reflects all participants in the study. It may be discovered that the data gathered from a minority of participants does not align with the story line. In these instances the researcher needs to revisit the data to re-examine the parameters that might be contributing to this variation.

By revisiting data Strauss and Corbin (1998) suggests the researcher is engaging in a process of Focused Reading. The original purpose of focused reading is to provide a more detail interpretation of the properties and dimensions of certain conceptual features of the isolated category. This requirement for greater detail constitutes the Category Refinement phase and is a consequence of revisiting the data in the Validating the Networks phase. The category refinement phase serves a crucial role in this analytical process as it provides the generalisations that emerge from the story line with greater conceptual density through inclusivity.

From this brief summary we can clearly see that this approach to data analysis involves a continuous iteration between the data collected, the coding system and the analytical processes that validate the generalisations that emerge. Gray (2009) concurs with this summation by suggesting that this multi-tiered to approach to data analysis with an emphasis on revisiting and recoding the data clearly demonstrates that the value of the Conditional Matrix rests within a recurring reassessment of data. This researcher is committed to applying this repetitive process to this research study until all concepts, sub-categories, core categories, subsidiary categories and all properties and dimensions are

engaged and no new categories emerge. At this point Strauss and Corbin (1998) would suggest that theoretical saturation has occurred and the analytical process is complete. This point is further reinforced by double checking that all core categories are identified and each contributes to the story line allowing an adequate theory to emerge.

4.8.4. Selecting a Sample Group Framework

A fundamental step in all research design is targeting an appropriate research cohort. Gray (2009) suggests that traditionally, experimental research is primarily concerned with sample groups that are representative of the population under examination and as such engage a system of probability sampling. However, for this particular research project such an approach is rejected for epistemological reasons. Neuman (2006) supports such a perspective by declaring that probability sampling is unrealistic and impractical. The success of this research project was dependent upon uncovering the unwritten processes that coaches use for establishing effective practice and developing expertise. As such, with this research project I avoided sampling processes that were likely to produce outcomes that could be perceived as generalisations of a typical and yet to be qualified population.

As a consequence of the qualitative design and considering that the research objectives seek to obtain insights into particular practices that are reflective of the contextual constraints in which they occur, the research cohort for this particular project was identified by ‘purposive non-probability samples’ (see Gray 2009, p.181). Patton (2002) supports the use of non-probability sampling by suggesting that research projects that adhere to a qualitative design should engage a resolute style of sampling that identifies a cohort of information rich cases that can be studied in depth.

To further demonstrate the idiosyncratic nature of qualitative research and a similar need for specific sampling frameworks, Patton (2002) identifies more than fifteen strains of non-probability sampling. Each of these frameworks is equally capable of delivering information rich cases but is individually designed to draw out ‘information rich’ cases under certain research constraints. While each strain of sampling continuum is capable of contributing to the research objectives of this project, ‘Criterion Sampling’ (see page 74) has been identified as the framework that is most supportive of the goals of this research project.

Under the guidelines of a criterion sampling framework, research participants are to be identified according to set of social and professional determinants such as being recognised practitioners and or being perceived as being able to assist in the exploration of a particular behaviour or characteristic that is relevant to this research. By engaging a criterion sampling framework it is expected that 'the research cohort is selected on the basis of the prime focus of the study' (Gray 2009, p.181). In this case research participants were identified and chosen on the principle that they may be able to contribute to an enhanced understanding of how coaches become effective practitioners and in the process identify and describe the mechanisms they have found useful for the development of expertise.

4.8.5. Identifying a Research Cohort

To successfully identify a suitable research cohort it was first necessary to establish a set of criteria that could be used to determine and identify those coaching practitioners who may be able to contribute most to the prime focus of this study. As simple as this may seem, Abraham, Collins and Martindale (2006) suggest that identifying experts or leaders in a contested field such as expert coaching practice is not as simple as it seems. Ericsson and Lehman (1996), Tuffiash, Roring and Ericsson (2007) and Wiman, Salmoni and Hall (2010) each support Abraham and his colleagues by insinuating that the current lack of conceptual clarity framing expert coaching practice is partly the product of engaging unqualified descriptors of effective practice as indicators of expertise. With such cautions in mind, and with an understanding of the guidelines of a 'criterion sampling framework' in place, benchmarks for identifying suitable participants were designed to reflect five essential elements of effective and or expert practice that were identified in the literature review. These benchmarks include: longevity of coaching career (minimum of 10 years coaching beyond a participation coaching level), involvement in performance coaching practice (more than two years' experience at either a developmental or performance level), demonstration of extensive domain specific and domain general knowledge structures (evidence of knowledge structures that are internal and external to their chosen sporting environments), contribution to coaching education and contextually determined success in a performance orientated environment. Collectively, these criteria are congruent with Côté et al., (1995) and Côté et al., (2009) definition of an expert coach.

As a consequence of applying these criteria, eight coaches from three interceptive sports had been identified as suitable candidates that could contribute towards the prime focus of this research project. Two of these eight interceptive sports coaches would be used in a small pilot study (see pages 26 and 97 - 98) to gage if decisions could warrant further examination as a possible determinant of expertise. On conclusion of this pilot study, six interceptive sports coaches remained as the research cohort of the larger study that sustains this thesis.

From the interceptive sport of Football (Soccer) the criteria sampling process has identified three research participants. Firstly, the Head Coach of one of the Australian open football teams. The second, a former National coach and current assistant coach to one to the Women's National League franchises and finally a former elite player and state representative coach who now plies his trade as the coach of an amateur senior A Grade team and junior team at the same community club.

From the sport of Rugby League the same criteria sampling process has identified another three high performance coaches who operate at two separate levels of Lyle's conceptual framework. First and foremost identified by this system of sampling was a coach considered as one of the most successful in the modern era of the National Rugby League (NRL) and currently the Head coach of a NRL Club. The Second candidate is the most successful coach in Queensland Cup history – a state wide competition that is widely regarded as the Nation's second tier competition. This coach also has an equally imposing representative coaching record and is regular contributor at high performance coaching education programs. The third coaching practitioner from the interceptive sport of rugby league was a long serving assistant NRL coach and former state and national age coach. This person while not immediately successful if measured by premierships has been instrumental in turning around the fortunes of three struggling clubs to the point that each club was a leading force in their respective competitions while under his supervision.

From the field of Rugby Union the criteria sampling process identified two suitable research candidates. The first is a former international player, former national coach and current national coach of a second interceptive sport. The second candidate is a former international player at a schoolboy level and is an ex-patriot currently employed as the Head Coach of a small developing National team. Both of these coaches are widely regarded in their fields as significant contributors to the development of wider community

coaching programs, and have only just made the transition into the realm of performance coaching.

4.8.6. Limitations to Sample Selections

Regardless of the measures taken by the researcher to ensure against bias and other validity concerns, qualitative research by its very nature will raise some questions regarding the objectivity or theoretical sensitivity for the research process. Neumann (2006) suggests that it is more prudent to meet these concerns 'head on' and declare any obvious limitations to the research process prior to commencement. With this in mind a number of limitations have surfaced as a result of the selected sampling framework, the researcher's personal history of involvement in certain interceptive sports and the very nature of constructing generalisations.

First, after applying the criteria sampling framework to a larger body of possible participants it has become obvious that all of the identified research participants are the same gender. In spite of the fact that more than one quarter of the research cohort are directly, or indirectly, involved with female interceptive sporting programs, all of the potential research participants are male coaching practitioners. While this may initially appear as a research bias, these figures while not completely accurate of the wider population but in fact are more reflective of the actual population of coaching practitioners who operate within these performance levels and sporting contexts.

A further concern associated with the conclusions of this sample group is the level of bias or theoretical sensitivity that will evolve as a consequence of the researcher's personal history of involvement in certain interceptive sports. While Strauss and Corbin (1998) argue that theoretical sensitivity is a fundamental element to the success of grounded theory, they forewarn researchers not to overplay their role in uncovering subtleties of meaning in the data. Theoretical sensitivity provides the researcher with the ability to attribute meaning to data, the capacity to comprehend information and the capability to separate the relatable information from that which is less pertinent. However Gray (2009) suggests that such a personal involvement may make it difficult for the researcher to reject priori assumptions. To overcome this hurdle, I maintained a healthy scepticism of emerging data by employing a conditional matrix of coding that engaged a complex web of

action / interaction analysis for determining the consequences pertaining to a particular phenomenon.

The final concern that stems from the sampling framework chosen is in effect an amalgamation of the two previous concerns and is more reflective of the whole research process. Lincoln and Guba (1994) assert that one of the most problematic issues that are continually raised with grounded theory research and purposeful non-probability sampling is whether or not its findings can be generalised beyond the study itself. Sparkes (1992) adds to this by suggesting that the problems faced by qualitative researchers are that subsequent generalisations may not be representative of the population as a whole. Again this concern has been directly addressed by the use of criteria sampling. By engaging open ended benchmarks for determining possible research participants the criteria sampling framework has identified coaching practitioners from three different interceptive environments. Through the use variable interceptive environments it is envisaged that of whatever generalisation emerge from the data they will be more reflective of a wider population.

5. Chapter Five – Results and Discussion

5.1. Introduction

After analysing the raw data according to the three phases of Strauss and Corbin's (1998) Conditional Matrix, a number of distinct consistencies began to emerge from the material provided by the research participants. As is the case with a Straussian interpretation of Grounded Theory (Strauss and Corbin, 1998), these consistencies have delivered a web of concepts, categories and core categories that have combined to provide the framework for a storyline that provides some deeper insight into how expertise in interceptive sports coaching can be identified, analysed and perhaps even developed. It has been through the construction of this storyline, which in itself is a product of Strauss and Corbin's (1998) reiterating cycle of coding and analysis, that the researcher has been able to unveil two theories. Mindful that theories, unlike themes, are effectively entire systems of testable ideas which are potentially refutable either by evidence at hand or later by examinations of reliability, this research proposes the following theories as a the product of an attempt to identify and understand expertise in interceptive sports coaching. Moreover, as suggested in sections 7.2.2, 7.2.3 and 7.2.4 (pages 187 – 188) it is hoped that this research acts as a platform for further research to either refute or assert and build onwards from the conclusions offered in chapter seven.

This research proposes two theories, each an entire system of testable ideas that collectively are accepting of and operable within, the many environmental constraints that have plagued earlier attempts to account for the esoteric nature of expertise in interceptive sport coaching (see Hodge, Starkes and McMahon, 2006). The strength of each theory lies within the depth of our existing understanding of each underpinning element. However, rather than interpret each of the following theories and their underpinning elements in isolation, the researcher urges that these theories be perceived as dynamic and interconnected constructs. These theories offer more than a mechanism for localising the key performance indicators of expert coaching practice in interceptive sports, but also answer the call by Abraham and Collins (1998) and Rutt-Leas and Chi (1993), who

espouse a need for research that provides insight into the thought processes that coaching practitioners use to support their experiential (and other) knowledge structures.

5.2. Realigning the prime focus of the research

As this study has been framed according to the methodology of grounded theory it is important to demonstrate that each of the two theories that have transpired are not externally generated, nor are they an attempt to explain the esoteric elements of expertise in interceptive sports coaching practice according to a schema. Rather this was a case in which an extensive review of literature related to the 'Coaching Process', 'Coaching Effectiveness' and 'Coaching Knowledge' revealed a knowledge vacuum regarding the academic professions' understanding of expertise in coaching practice of interceptive sports. It was this revelation of a knowledge vacuum in the literature that provided the impetus for the first research question:

1.1 How can expertise be identified in Interceptive Sport Coaching?

While a review of literature identified that a myriad of indicators for determining expert performance had previously been proposed, much of this research attends only to the differences between individuals perceived as experts and those perceived as novices. Rather than analysing the quintessential aspects of expertise much of this earlier research focused only on the perceptible differences between absolute and perhaps 'ill-defined' coaching practitioners. Consequently many of these early indicators of expert coaching practices fail to meet certain criteria for the determination of expertise; namely reliability (Ericsson and Smith 1991) or contextual dependency (Lyle 2002). With this in mind it was decided to widen the review of literature to include research other than that which adopts the theoretical perspectives of Positivism to include research that could provide some direct insight into expertise as a socially driven interplay that exists between subjects and objects. Consequently a review of literature framed by theoretical perspectives of Interpretivism was undertaken (chapter 3).

This subsequent review of literature (presented in chapter 3) uncovered an existing body of research that had previously analysed this subject area in a great number of different

perspectives. Most fortuitously however, this same review of literature identified a consistency in the suggestions offered by the academics involved in this area of research. Since 1986 researchers have regularly proposed that 'decisions' or 'decision making' be received as a key performance indicator of expertise in not only coaching practice but recently in many other disciplines such as medicine and surgery (Norman et al., 2006), transportation (Durso and Dattel, 2006) and chess (Gobet and Charness, 2006). However, in spite of multiple publications promoting 'decision making', Abraham and Collins (2011) suggest that there is very little evidence of research that attempts to consolidate decision making or other cognitive mechanisms as an actual indicator of expertise. Apart from the concept papers referenced in this thesis there is little evidence of research that attempts to analyse the processes that sustain the mechanisms which coaching practitioners use to produce these tangible act of expertise. As a consequence of this review of research that adopts an Interpretivist perspective, a second research question was unearthed:

1.2 Can we use decision making as an indicator of expertise?

The nature of these first two research questions appeared to be too simplistic. To determine if this was the case an independent pilot study was initiated. Initially, this pilot study was intended only to determine whether or not other novel indicators of expertise could be proposed from the field, and if not, if the notion of a 'decision' warranted further examination as a potential indicator of expertise in interceptive sport coaching. This pilot study engaged two highly regarded coaching practitioners in two semi-structured interviews. This pilot study revealed a common belief shared by both participants regarding decisions made by the coaching practitioner. While acknowledging that a decision represents the lowest common denominator of all coaching actions and recognising the sheer volume of decisions that they each make on a daily basis, both participants initially suggested that decisions alone could not be representative of expertise as '*anyone can make a decision, it's knowing what decision (to make) and when to make it that counts'* and *'not all decisions are equal, the decisions you make in the office are much easier than the ones you have to make on the paddock – but for completely different reasons'.*

On the surface, the responses garnered from the pilot study may appear to work against the intentions of the second research question and consequently incongruent to the larger

goals of this research, as both participants asserted that 'decisions' could not be considered as a suitable indicator of expertise in interceptive sport coaching. However after elaborating on their responses it became apparent that the participant's views were in fact more supportive of the second research question then first expected. While both participants asserted that 'decisions' (alone) could not be considered an indicator of expertise, their justifications for such statements would prove much more helpful then they initially appear. This point is reinforced by comments such as *'How are you going to assess a decision*, *It's just a guess unless you can explain where it came from'* and *'you won't always be right, but there are things that you can do to make sure you're right more often, it's all about justification'.* Echoing the views of Nash et al., (2010), each of the research participants indirectly suggest that the hallmark of expertise could rest in the accuracy of decisions being made. Consequently these comments, among others, not only appeared to support a continuation of this research, but also recalibrated the direction of this research.

As stated earlier (page 26), this pilot study was conceived to determine whether or not decisions made by interceptive sports coaches could stand further examination as a suitable indicator of expertise in interceptive sport coaching. However, while the findings from the study certainly did support the notion of initiating further research, the responses offered by the two pilot study participants would alter the primary focus of this research project. Contrary to the literature, data from the pilot study would suggest, that while a decision may not be well received as an indicator of expertise, a decision could be perceived as perceptible evidence of expertise – albeit a tangible sign of earlier actions (the coupling of perception and cognitive skills) occurring that are more likely to be indicative of expertise.

The data from the pilot study have enabled the researcher to make two assumptions that would realign the prime focus of this research. The first assumption stems from the recognition that a perceptual-cognitive, yet nonfigurative process most likely precedes each decision. This recognition of an abstract process underpinning a 'decision' highlighted a need to realign the focus of this research and consequently the research questions to concentrate on the utilities that sustain a 'decision making process'. The second assumption is bound to the principles of justification and accountability that were raised by the research participants of this pilot study. If a 'decision making process' can be established, then according to the aforementioned principles of validation, a window of

opportunity may exist for the inclusion of Ericsson and Smith (1991) Expert Performance Approach (EPA) to be engaged as a mechanism for grading expertise in future research.

It was on the basis of these assumptions that a further two research questions evolved from this pilot study:

1.3 How do expert practitioners make decisions?

1.4 Can we use this knowledge to expedite the development of expertise in potential coaches?

For organisational purposes, this chapter will now present an abridged account of the responses offered by the research cohort of six coaching practitioners from three interceptive sports. I have opted to present this collection of comments from each of the research participant as individual blocks of data. Each block will precede the 'Discussion' and 'Summary' of responses to each set of questions that accompany each of the four research questions. The responses offered by participants, to each set of research questions are presented in sequential order. The coaches' comments have been coded according to the chronological order of occurrence. For example from the code C1.1: the C1 represents Research Participant number 1 (Coach 1), the .1 suggests that this is the first comment that was offered by this coach and is being used in this thesis. Therefore the code C5.4 represents the fourth comment presented in this thesis that was offered by research participant number 5.

This system of coding and block presentation of data will enable the researcher to weave individual comments into an all-encompassing discussion of the research participants' responses. The benefit of this approach is twofold; first this approach enables the reader to extrapolate meaning from the sport specific language and use this language to help understand the links that have been built between the responses and the conclusions raised in the 'Discussion' and 'Summary' of participant responses. Second this approach provides a much more efficient manner of presenting data, particularly that data which is used on a number of occasions.

5.3. Participant responses to research questions 1.1

How can expertise be identified in Interceptive Sport Coaching?

One of the initial goals of this research was to build onwards from the pilot study and seek the opinion of a larger body of research participants regarding tangible indicators of expertise in interceptive sport coaching. While the literature review underpinning this research clearly proposes decisions and or decision making, among other possibilities, as an indicator of expertise it was imperative to the integrity of this thesis that I did not impose decision making as a feature of expertise upon the research cohort. As such, the first sets of questions asked in each of the initial interviews was concerned with extracting a genuine response from each of the interviewees regarding their own perceptions of expertise in their respective fields of coaching practice. Rather than lead the interviews towards the notion of decision making as a prime indicator of expertise, this research was designed to establish a platform from which the researcher could extrapolate inferences and conclusions from the research participants regarding their own interpretations of expertise. Interestingly while all of the research participants had surpassed the obvious benchmarks that are traditionally offered to justify expertise; for example qualifications, premiership success and peer recognition (Wiman, Salmoni and Hall, 2010), not one of the research participants offered such arbitrary evidence to validate their status as expert practitioners.

C1.1 - You blokes will think it's the premierships, you shouldn't. It's like (player's name) and (player's name), you only see how good they are after they score, or the pass [they throw] that leads to a try. What you don't see are their flaws and how hard we have worked to overcome them.

C2.1 - Winning last year has certainly stopped the dogs [committee, media, supporters etcetera) from barking, but it doesn't reflect how much I had to give. It's so much easier to win it [status of expertise] as a player [then as a coach].

C2.2 - It was real tough to come in here, knowing the problems (players) they had last year and knowing that those problems were still here. I had to manage

some real egos to make sure that I got the best out of everyone. People don't see that, all they see are the NRL stars and they shoot you down.
C2.3 - I could only win it or fail. There was no second with that team.

C3.1 - We hope to qualify for England in 2015 [performance indicator set by the employer], but we are still minnows here, Barca [as a sporting symbol of Catalan separatism] is infused into their cultural upbringing, at this stage [structurally] winning is sometimes beyond us. That doesn't mean I'm no good – we're growing. It takes time; I would like to think that our admin can see how much I am teaching these blokes, recognise the work like going into schools that (player's names) and I do to help them learn the game.
C3.2 - I became a much better player after I started coaching. When I was playing I just ran around and did my thing without thinking too much about it. I began to think more about the game and understand it more when I had to explain it to kids. So we all coach

C4.1 - Like it or not, I will be judged by whether or not we win tomorrow and make it into the Four Nations and that's wrong.
C4.2 - I had to build the right culture, a professional attitude even before I could consider tomorrow and next October [asking the players to set higher goals then making the national squad].
C4.3 - What I won't be judged on is how I have built depth and field knowledge to compete in that series. They don't care about the quality of the opposition or whether they have improved, just whether we win.
C4.4 - (field knowledge) it's helping them understand what we want to do, why we do it and what their role means to the bigger picture.

C5.1 - That's a good question, if winning trophies and coaching awards is the sign of an expert then I've been lucky.
C5.2 - Everyone wants to win the title, but if that's how you determine whether or not you're an expert then you will have a short career [insinuates either emotional / mental breakdown or contract termination]. All I ever try and do is leave a squad in better shape than when I arrived.

C5.3 - Better people, better players [one and the same], better managers [developing the coaching and support staff], better CEO's, better scholars of the game. And getting us all working from the same page and for the same goal.
C5.4 - Well that's why I spend so much time with the W League. If I can get those coaches to ask the same things from their players that I will be asking from them then we should have more quality players doing quality things more players fighting for the same thing

C6.1 - I suppose knowledge and vision has a bit to do with it. But it's what you do with it. I know some real smart blokes [football coaches] who can't coach a Choko vine over a [outhouse]. I'm not having a go at them they are real good development coaches or assistants.
C6.2 - Well they've got all their tickets, but look out here (pointing to a coach and to a game in progress) it's like he is trying to show people how qualified he is but he isn't coaching to the needs of his players.
C6.3 - Communication is the key – for you and me! Listen to what he is saying, it's telling you what he is looking at and what he is thinking. He's not coaching and he can't tell the boys what's going on out there or how to change it.

5.3.1. Discussion of participant responses

From this small collection of responses offered above regarding the interviewees' interpretations of expertise we can draw two valuable inferences. The first inference is concerning the research participants' depth of understanding regarding the notion of expertise. The second inference supports the views of Werthner and Trudel, (2006) who suggest that coaching practitioners have difficulty agreeing on the conceptions, perceptions and philosophies that are most indicative of expertise. However, in spite of these difficulties, the coding process extracted a considerable degree of consistency among the research participants' opinions regarding what actually constitutes expert practice.

From the responses offered by the research participants to questions concerning indicators of expertise, it was evident that at one time or another each of these highly regarded practitioners has had their coaching performance measured according to

arbitrary performance indicators. As a consequence of this experience, the research participants have each developed strong pragmatic positions regarding the effectiveness of such strains of performance assessment. For example, five of the six research participants directly acknowledged that their professional standing as an expert has been, and or continues to be, evaluated by performance related outcomes such as championships, qualification for elite tournaments or positions on a premiership ladder (see C1.1, C2.1, C3.1, C4.1, and C5.1). However, while each of the research participants accepted this as standard practice, they each concurred with the views of Horton, et al., (2005) and offered references as to the ineffectiveness of this one-dimensional approach (see C1.1, C2.1, C3.1, C4.3, C5.2, and C5.3).

Simply recognising the shortcomings of these traditional measures of success, or expertise, does not constitute a depth of understanding. The research of Cushion et al., (2003) reaffirms this point by suggesting that one-dimensional approaches such as perceptible success, experience and qualification can prove pervasive in the determination of expertise. However, the profundity of the research participants' perceptions regarding these arbitrary measures is most clearly demonstrated in the anecdotes they offer as evidence of more suitable and contextually orientated indicators of expertise. Further to this, their depth of understanding is additionally demonstrated by the reasoning skills they use to justify these alternative measures. For example, while all six research participants offer alternative anecdotes of expert performance in interceptive sport coaching, four members of the research cohort make specific reference to highly efficient learned developmental skills that they believe are central to them achieving the obvious and more tangible touchstones generally used to determine expertise.

Of these four anecdotes that individual research participants offered as evidence to support their argument for alternative indicators of expertise, two resonate heavily with a direct performance agenda while the other two lean more towards holistic interpretation of coaching practice as a key indicator of expertise. Research participant one makes reference to his innate ability to analyse a player's performance for strengths and weaknesses and to be able to develop the individual players capacity for higher performance according to this analysis (see C1.1). Research participant 3 offers a developmental role of a slightly different kind. While success has come in the traditional fashion for this coaching practitioner he suggests that this arbitrary success is a direct result of the developmental work that he and his players do in the wider community (see

C3.1). Again at a superficial level, these responses from research participant 3 appear to be suggesting that his wider community work is the benchmark of expertise. However after closer scrutiny it is not the act of building the profile of the sport and widening participation but rather a case of developing a player's knowledge and understanding of the more complex principles of the game by asking his players to teach others these same principles that has brought about improved performance in his players (see C3.2).

Similarly, research participants four and five each offer comparable experiences that highlight their ability to develop the individual capacity of players as the underpinning feature behind their expert practise. However, unlike research participants 1 and 3: who focus directly on the physical performance of players, these coaching practitioners claim that the essence of their success stems from a wider focus of attention. Each of these two research participants suggests that introducing a cultural shift from individual performance to the development of an organisation that has been most responsible for achieving the traditional markers of expertise. Research participant 4 suggests that it has been his ability to implement a culture of '*high personal expectation'* (over a period of 3 and half years) that has stood him in good stead for success and ultimately earning recognition as an expert practitioner. Research participant 4 suggests that past national sides have failed on the basis of players settling for national selection rather than being competitive on the international stage. Again at a purely superficial level it appears that this coaching practitioner is drawing attention to his ability to motivate his charges to achieve at the highest level. However, this coaching practitioner further develops his point by suggesting that he believes it is his ability to empower a predominantly local base of players, to increase their cognitive understanding of the nuances of the roles that they each play in the team and to link this enhanced cognitive awareness to the physical demands of the game that has contributed most to him being widely acknowledged as an expert practitioner (C4.3 and C4.4). Research Participant 4 attributes his ability to help players establish a link between the cognitive and physical domains of the game as the feature of his practice that has contributed most towards his recognition as an expert practitioner.

Research participant 5 offers a very similar perspective to that of participant 4, albeit with a more universal framework. This research participant (and to a lesser degree research participant 2) attributes all of his success as a coaching practitioner to a simple personal philosophy of aiming to leave an organisation in better shape than when he arrived (see C5.2). This research participant perceives success as a product of aligning all facets of a

large organisation. Where other members of the research group direct their focus of attention towards the playing staff that they are directly involved, this coaching practitioner suggests that expertise is achieved by ensuring that all coaching, administrative, support staff and peripheral programs are operating '*from the same page'*.

Research participant 5 supports this holistic approach by suggesting that the actions which have contributed most towards him being regarded as an expert practitioner (as a national coach) have been those that involved him working with the coaches and players of the national leagues and competitions that directly provide players into his national or club teams (see C5.3 and C5.4). Research participant 5 suggested, *"Yes it is a fair commitment, but the harder I work with the coaches and players from the Women's League, the more people I have building towards our ultimate goals. Obviously having another 7 coaches implementing our (my) national program has to make my task a lot simpler*". Research Participant 5 believes that it is his ability to orientate open state and state age group coaches towards the national program (implement and develop his specific style of play in localised competitions) that has contributed most towards his status as an expert practitioner. More specifically, this extremely successful and highly regarded coaching practitioner justifies such a belief by suggesting that his recent success is the product of his ability to coordinate the efforts of others who can collectively increase the standard of the national league rather than any capacity for developing individual talent.

The responses offered by the sixth research participant portray a similar yet parallel message to that presented by the five preceding participants; however, the responses offered by this participant are as unique as they were unexpected. Unlike the previous five research participants, research participant 6 had not completed formal studies in education, yet his responses to questions regarding the identification of expertise portrayed a profoundly implicit educational message. While also raising concerns regarding the traditional characteristics of expertise, the opinions of the sixth research participant are deeply embedded in the processes of coaching practice rather than the product of coaching practice. Replicating the views of Ericsson (2007) and Williams et.al. (2008) this coaching practitioner suggested that while experience, knowledge and qualifications are all essential features of an expert coaching practitioner, they alone do not guarantee expertise (see C6.1 and C6.2).

The sixth research participant was more inclined to propose that one's ability to read a game (a game of any ability level), then adapt the appropriate knowledge structures and communicate his conclusions to his players – in a language appropriate to the players' ability level as the paramount features of expert coaching practice (see C6.3). As mentioned above, while the intention of these initial questions were only to establish a platform from which inferences regarding expertise could be extrapolated, research participant 6 clearly voiced a learned understanding of a coaching process without coercion from the researcher. Furthermore, his understanding of a coaching process is reticent to the 'process before product' conclusions made by Abraham and Collins (1998), Nash and Collins (2006) and Werthner and Trudel (2006). Although constrained by his own inability to verbalise the abstract concepts that he engages as an interceptive sports coach, the responses offered by research participant 6 unreservedly proposed the notion of meta-cognitive knowledge skills as a perceptible indicator of expertise in interceptive sport coaching. Furthermore in the process of explaining his perspective of expert coaching practice he indirectly demonstrates a primacy for a decision making process as an indicator of expertise.

5.3.2. A summary of the responses and discussion of research questions 1.1

In summary of the responses offered to the first set of questions addressing the research topic of identifying expertise in interceptive sports coaching this research group demonstrated a considerable quantity of consistency. This point is surprising, as two members of the research cohort appeared to approach the interview process with preconceived ideas regarding the intentions of this research. This point is most clearly reinforced by the following statements from research participant one, *"What you guys have got to realise is that this is an art, it's not a science"* and from research participant two, *"Well I suppose all you want is to hear about is last year"* (unexpected Grand Final success). However, in spite of this cautionary approach by some of the research cohort a collective picture regarding how expertise in interceptive sport coaching was identified and how it should be identified did emerge.

All six research participants were adamant that expertise is currently determined by performance based goals. However, all six were equally as steadfast in their declaration that expertise in coaching interceptive team sports should not be determined by such arbitrary measures. To reinforce this point five of the six research participants offered

anecdotes, all similar in context, that highlight various type of interactive skills as a more suitable gauge for identifying expert practice. While not one of these five research participants actually used the term ‘decision making’ or directly spoke of a ‘decision making process’ as an exemplar of expertise, they each described coaching actions that clearly require coaching practitioners to decode and evaluate information for the purpose of creating an action – a decision.

The sixth research participant was not indifferent to the preceding five research participants. However, this research participant was much more philosophical about coaching practice and consequently was conscious of the notion that coaching involves a process of interpreting and encoding live information as a means of generating context specific actions. Again while this research participant did not actually use the terms ‘decision making’ or a ‘decision making process’, this coaching practitioner and research participant made comments that enable strong inferences to be extrapolated which demonstrate that decision making could be more closely scrutinised as a potential indicator of expertise in interceptive sport coaching.

5.4. Participant responses to research questions 1.2

Can we use decision making as an indicator of expertise?

The findings from the first set of questions regarding the identification of expertise were supportive of ‘decision making’ or even a ‘decision making process’ being examined as an indicator of expertise. However the same questions did not elicit a response that directly proposed ‘decision making’, or any other trait for that matter, as an indicator of expertise. Currently, there are two popular trains of thought that attempt to explain the ambiguity that clouds our understanding of expertise in interceptive sport coaching. Hinds, Patterson and Pfeffer (2001) best capture one or these two paradigms by suggesting that the highly contested environments in which expert coaching practitioners operate precludes these practitioners from passing on the nuances of their skill set. The second of these trains of thought is well represented by Nash and Collins, (2006) who delicately propose that it is more the case of coaching practitioners being unable to articulate the more abstract processes and as a result these processes are then labelled as ‘tacit knowledge’ by default. On reflection of the volume of responses collected from the interview process, it is

offered that the irregular flow of direct and definitive responses to these research questions was as Nash and Collins, (2006) suggest, more an indication of inexperience at verbalising the inner processes that they each use when analysing interceptive play. However in spite of such difficulties a number of crucial findings and concepts were extrapolated from the second set of research questions that have contributed towards a better understanding of whether or not decision making could prove to be a pertinent indicator of expertise in interceptive sport coaching.

C1.2 - Of course you can, but it's pretty obvious when a bloke misses a tackle. The trick is working out why he missed and showing him how to fix it. You can't nurse them here.

C1.3 - These blokes can all tackle, in spite of what the media says. They're pretty talented blokes; they play against some fast brilliant attacking players. The difficulty they face is not whether they can tackle, but making the right choices in defence.

C1.4 - If they miss a tackle it's because they made a poor choice or made the right choice too late, not because they can't tackle. They all get beaten sometime.

C1.5 - Of course [players replicating the coaches decisions]. They're my patterns and I determine who defends where, based on [my understanding of] their strengths and their role in the team and what our opponents are going to try and what they end up doing to us.

C1.6 - It's not my job to pull them apart for missing a tackle. My job is to calculate why they missed the tackle and make sure that it doesn't happen again [determine how the error in judgement occurred]. You don't want to get caught in the same place twice [same players making the same errors in defence]. That's my job.

C1.7 - We prepare for what's going to happen to them on Sunday but you don't have to tell these blokes too much, unless the situation changes during the game. I will say something if that happens.

C1.8 - If you want to look at it like that, they're acting on my actions [decisions], but these games aren't as straight forward as you think. They're constantly changing.

C1.9 - Of course I am responding (generating decisions) to the game.

C2.4 - Well yeah but everything that I do here is based on one decision or another.

C2.5 - They're not all like that [complicated human resource decisions]. Some [decisions] are easier than others, really simple. You know everyone wants to know how we train, but we didn't win because of the skills and drills I used or the fitness program that (assistant coach's name) had us doing. That stuff is simple – buy a book.

C2.6 - You earn your keep on Sundays. They're (the decisions made during a game) the toughest to get right and are the most crucial to winning.

C2.7 - I had some real talent so I can steer away from a strict pattern in attack. The boys all know where we want to go [in attack], but how they get there is up to them. All I ask for is at least 2 points of deception in every set. I will talk to them about their choice of deception, when they send it, who they targeted and those sorts of things.

C3.3 - Yes, but how are you going to measure a decision? Which decisions would you look at? I make a mountain of decisions every session.

C3.4 - I had to work out [decide] whether to train with full contact or not. Obviously that is the best way to teach timing and vision, but if they are worried about getting hit [at training] they aren't going to be looking for the spaces and opportunities that I am trying to show them. I know that captain's call [unopposed practice of attacking patterns] is limited, but you work out quickly in this game that you can only work with the cattle that you've been given and if your stock is low you don't want to cull any of them unnecessarily.

C3.5 - I am pretty sure every coach at this level can do that [disagrees that altering training episodes and long term training plans is a sign of expertise].

C3.6 - No not in a game [asked if every coach can generate decisions equally in a game context], that's where you see a difference. A good coach can make a difference.

C3.7 - Yes and no [asked if decisions made at training are easier than those made during a game], they're just different. Of course you have more time but you're trading the learning experience for safety. Sometimes you have to think just as quickly [at training] as you do in a game. You know you might be doing a bit of set play stuff and you realise that so and so is running the wrong shoulder

or looking at the wrong space so you have to jump in straight away to tweak the player.

C3.8 - It's definitely more difficult back home [making game related decisions] the game is played so much faster back there. You know last week against (an opposing team) I noticed that they hadn't shaped up on the short side from a scrum restart. I was about to send out the message, but then I notice (player's name) was already there, he had seen the same thing as me and was ready to run the play. You don't have that time in Premier Grade [the highest competitive level that the game is played in Queensland]

C3.9 - Well I guess you could [judge a coach by their game related decisions] but in reality you have to remember that these blokes [employers] don't really understand the game, they're just passionate about it.

C3.10 - You really have to search for it [information for making decisions] and you can't look for something without a plan. In our last [representative game] I had no idea of what we were up against. So we started the game by switching channels after each phase [to test their shape], I am looking for how they adjust, do they slide or regroup, do they play a set structure, I am looking to see how fast they are, looking to see if they are hiding someone, those sorts of things.

C4.5- There are all sorts [of decisions] these ones are obvious and straightforward [referring to planning for training and development]. I can off-load these once the plan is in place.

C4.6 - The man management stuff can be tougher.

C4.7 - It's much harder in games [less time to make decisions during a game]. I have trained myself to watch the other team [opposition] especially when we are attacking.

C4.8 - Coaching looks simple on TV, that's why everyone thinks they can do it and are quick to tell you where you went wrong, but they don't understand, everything that we do with the ball has a reason. I'm looking at how they line up, to see if we can move them [away from their defensive pattern], creating an opportunity [to exploit] or not.

C4.9 - Yes and I'd rather be judged by my involvement in the game then the final result. Judge me on what I do, not on what my players do. I don't know if you can do that but these blokes [players and support staff] seem to value what I have to say.

C5.5 - Communication, probably [indicator of expertise]. That's why I decided to take on this role [coaching a national female side after profound international success with male teams]. I knew I needed to improve my communication skills and if you want to improve your communication skills, coach girls. They want an explanation for absolutely everything [drill, formation, style of play]. And they all understand things differently too.

C5.6 - Good communication comes from a good plan, good understanding [of the players], good knowledge [of the game], good game awareness, and this makes it possible [to make good decisions]. You're a better communicator when you really know what you're talking about.

C5.7 - It doesn't really matter if it's [the decision] right or wrong. A good coach should have a reason, or evidence to explain everything they want their players to do.

C5.8 – Yes I guess you could look at the half time chat. If you really listen, you can tell who [which coaches] has the goods [produce an action / decision].

C5.9 - The whole job is just a chain of decisions. Communication [knowing what to say, how to say it and when to say it] is the sign of a decision being made.

C5.10 - You know how good your decisions are by how difficult it is to explain them. It's got to make sense to the players [relevant to the plan].

C6.4 - You've got to know your opposition and if you don't know them you have got to work them out real quick [read the game to determine the opposition's intentions].

C6.5 - All this thinking comes out in what I say to the boys. People might think that I just say stuff for the sake of hearing my own voice. But every comment means something, something we have done or didn't do.

C6.6 - with the kids, it's [the plan] the same each week. With the big boys the plan changes all the time depending on how well our game plan is going, and what they're doing to us. My comments [decisions] are specifically related to our game plan or how to upset theirs. That screaming and swearing at your players is pointless.

C6.7 - I suppose so, [suggesting that decisions are the result of other skills: vision, knowledge, understanding abstract concepts etc.], I haven't thought about it like that before. When you think about it like that it should be [the marker

of good coaches], but those other things contribute to how good your decision is.

C6.8 - I reckon you could, like I said before with this bloke, he isn't teaching them anything. He is telling them to play like the (A League team) - there wouldn't be more than a dozen blokes in the world that could accurately pass the ball that far across the field. You can't coach from a manual, you got to read play and adapt what you know to the meet the skills of the player that you have got.

5.4.1. Discussion of participant responses

Allowing exemplars of expertise in interceptive sport coaching to emerge from the interview process was a priority for this research project. For the purpose of maintaining integrity, it was imperative that each research participant be provided with opportunity to volunteer his own views and personal accounts of expert practice. While each of the research participants had willingly provided narratives that would lead the interviews towards the discussion of decisions and 'decision making', not all research participants were willing to use either term in direct reference to evidence of expertise. The most notable practitioner among this research group to abstain from using these labels was participant 1. This member of the research group maintained a stoic resistance to the use of either term throughout the interview process. While still beneficial to the greater objectives of this research project the responses offer by this subject can be attributed to a personal philosophy that maintains coaching as an innate skill set rather than a deducible practice.

Notwithstanding of the various perceptions and personal philosophies presented by each of the subjects, all members of the research group provided detailed narratives and anecdotes describing their own understanding of expertise. However, in accordance with the views of Werthner and Trudel, (2006) each of these descriptions of expertise appeared to be as diverse as the fields from which each member of the research group was drawn. Despite this irregularity in the responses offered by the research participants, the coding process uncovered a number of consistencies in the opinions shared by each member of the research group. This first consistency emerged as the product of each research participant either directly identifying decision making or indirectly revealing a decision

making process as the lowest common denominator of expert practice in interceptive sport coaching. The second and third consistencies play a subsidiary role in this research project. These two consistencies are primarily concerned with detecting features of the decisions made by coaching practitioners enabling the researcher to narrow the focus of the research group.

The first consistency in the responses offered by the research group strongly pronounces affirmation for decision making as a possible indicator of expertise. However, this level of confirmation fluctuates between a cautious agreement and an emphatic declaration of support. In spite of these fluxes, evidence of support for the decisions made by coaches to stand as a possible indicator of expertise is evident in the responses of all six members of the research group. Participants 2, 3, 4, and 5 each directly implied that 'decision making' played a central role in the successful completion of their duties as high performance coaching practitioner. The acknowledgement of 'decision making' as a possible indicator of expertise is exemplified by research participant 2 who suggest that each and every action that he commits to as a coaching practitioner is the outcome of a considered decision (see C2.4). While two members of the research group (participants 1 and 6) did not directly assert that decisions played an important role in them successfully fulfilling the duties of a high performance coach, they each offered detailed anecdotes that indirectly articulated 'decision making' as an underlying and crucial aspect of coaching practice. This point is also established by research participant 1 who describes expertise, as the ability to make the necessary 'calculations' required when situations in a game change unexpectedly (see C1.6).

Apart from confirming the research question of whether or not a coaching practitioner's decisions making could act as a determinant of expertise, two subsequent consistencies had also been garnished from the responses offered by the research group. These subsequent consistencies are concerned with the variability in the type of decisions being made[6] and the variability of value associated with the decisions being made[7]. While these consistencies do not openly support decisions or decision making as an exemplar of expertise, they do add to our currently incomplete understanding of decisions and

[6] This defining trait labeled as Type of Decision is the collective representation of subordinate factors such as time, preparation and by the degree and location of information streams.

[7] The defining trait labeled as Value of Decision represents the impact that the decision has on achieving process goals only.

‘decision making’ by providing seminal insight into the category of decisions that most reflect expertise.

The first of these two subsidiary consistencies to emerge was concerned with a need by members of the research group to establish that a distinction existed between the types of decisions made by coaching practitioners. This point was made more relevant by the research groups’ implication that not all types of decisions could stand as suitable indicators of expertise in interceptive sport coaching. Amid positive consensus by the research group for decisions or a ‘decision making process’ to stand as a possible indicator of expertise, some genuine apprehension was raised concerning the type of decisions that would be used to qualify expertise. Research participant 3 demonstrates this concern by innocuously suggesting that in the practice of coaching he makes a large number of decisions and consequently asks, “Which decisions would you look at [measure]” (see C3.3). Similarly, research participant 2 and 4 suggest that there are different types of decisions and that some of these decisions require less cognitive output then others (see C2.5 and C4.5). Research participant 4 expands upon his views of variability in the type of decisions used by coaching practitioners by declaring that planning and development related decisions are “obvious and straightforward” whereas decisions relating to “man management” issues are much more complicated (see C4.5 and C1.2).

Research participant 2 adds weight to this idea of a disparity between classes of decisions when he raises the notions of knowledge acquisition and application. Participant 2 suggests that his training related decisions are “simple” in comparison with his game day decisions which are much more demanding. This statement labelling one class of decisions as “simple” is founded in a belief that the information and cognitive reasoning’s required to make decisions relating to skills and fitness are bound in declarative knowledge structures that can be found in a book (see C2.5). Research participant 2 perceives these training related decisions to be simple in comparison with game day decisions, which are more demanding to generate. Research participant 1 adds to this notion of game day decisions being more demanding by inferring that expertise is exemplified by his ability to generate decisions through a process of calculating and addressing the reasons errors have occurred before they reoccur.

Research participant 4 also mentions a disparity between the statuses of decisions made by coaching practitioners while raising the notion of preparation. Participant 4 suggests

that all coaching practitioners (at this level) are capable of making accurate training related decisions as they have the benefit of a training program that is framed with learning objectives and a malleable opposition. The intimation made by this research participant is that all high performance coaches' employ a structured training program. These training programs and the ability to manipulate the 'friendly fire' of opponents enable the coaching practitioner to make justifiably accurate decisions in a training environment. Research participant 6 concurs with this notion of training related decisions evolving from a plan or training blueprint by suggesting that every statement (decision) that he makes to his charges is made with reference to something that they have previously discussed at training (see C6.5 and C6.6).

In the course of reviewing the responses that elaborate on variability in the type of decisions made by coaching practitioners, a second subsidiary consistency was discovered. This accompanying consistency details a belief among the research participants that some decisions are more valuable than others. This issue of variable values attributed to certain decisions is most clearly argued by research participant 2 who considers game day decisions to be "most crucial to winning" (see C2.6). The value that coaching practitioners attribute to this type of decision stems from a strong belief that the actions of a coach during a game can impact greatly on what occurs on the field of play. Whether it be through innate wisdom, experience or preparation these coaching practitioners each insinuated that the decisions they generate have the capacity to guide the performance of a player (C1.5 and C1.6), determine the intentions of an opponent (C3.8 and C3.10) or even influence an outcome (C4.8 and C6.4).

While role of the coaching practitioner has been well established in earlier research endeavours, the reality of what coaching practitioners actually do and the significance of the decisions they make during a game has been drawn to the fore of this project by research participants 3 and 6. Acknowledging that a timely and accurate coaching interjection (decisions) can have a significant impact on the outcome of a game, participant 3 uses the constraint of time as a distinguishing factor between training and game related decisions. Research participant 3 proposes that the dynamic nature of interceptive sports renders the opportunity for coaching practitioners to perceive an opportunity to act as limited by time. Due to the fluent nature and speed at which these games are played it is suggested that the life of the information streams that fuel a decision are as dynamic as the game themselves (see C3.8, C1.4 and C1.6).

Similarly, research participant 6 attributes the heightened value of game related decisions as a consequence of the critical thinking skills that fuel this category of decisions (see C6.4). This research participant perceives the role of a coach equal to that of a non-playing captain. As the extra set of eyes observing the action and with a different viewing angle to that of his players, this coaching practitioner interprets his involvement in the game as a strategist. Consequently this research participant suggests that his game day decisions are more valuable than those made on the training field as they are calculated rather than speculative (see C6.6). This scheming and or calculating perspective of an expert coaching practitioner of resonates heavily with that offered by research participant 1. Both participants offer anecdotes that identify expertise in coaching practice as being able to act on what is played out in front of you.

The final point confirming the heightened value of game related decisions as opposed to other coaching related decisions can be left with research participant 4. This seasoned coaching practitioner suggests that he would prefer if his performance as a coach were determined by his involvement in a game rather than the physical efforts of his players or the result they achieve (see C4.9). If the purpose of this set of research questions was to identify an objective tool for determining expertise, then we could do worse than recognise the wishes of coaching practitioners. While valuing and recognising the many decisions that they each make, coaches clearly have difficulty in attributing expert practice to any form of decisions other than those that occur during a game. It is not beyond reason to suggest that the decisions that they do make during a game are the product of the decisions that they implement during training. Whether game day decisions are relative to earlier decisions or not is inconsequential as the coaching practitioners themselves identify expertise as the ability to calculate live interceptive play and interject when the need arises. If we can accept this philosophy of expert coaching then we can certainly offer game related decision making as the objective tool most suitable for identifying expertise in interceptive sport coaching.

5.4.2. A summary of the responses and discussion of research questions 1.2

The responses offered by the research group to the second set of questions have provided this project with momentum and direction. First, momentum was achieved by the support received from all research participants regarding the potential for decision making to stand

as an objective indicator of expertise. This support however, was not as comprehensive as it had initially been expected. It would be fair to suggest that there was a fickle degree of commitment in the affirmative responses offered by some members of the research group. However, it is equally fair to suggest that much of this fickleness stems from what Saury and Durand (1998) described as an inability of some coaches to rationalise the temporal aspects of coaching.

The views of Saury and Durand (1998) are well documented and were purposefully raised in the review of literature that underpins this research project as an issue that may have hindered the data gathering process. However, more significantly, the research methodology that frames this project has inadvertently contributed towards variability in the affirmative responses offered by the research group. As mentioned above it was imperative to the integrity of this project that the research group propose their own indicators of expertise rather than having a specific concept imposed upon them. As a consequence of allowing the indicators of expertise to emerge from the interview process an unnecessarily large spectrum of decisions made by coaching practitioners was identified. Additionally some indeterminacy shown by research participants for 'decision making' to stand as an indicator of expert practice was more a reflection of the breadth of decisions recognised by the research group rather than any discrepancy regarding 'decision making' as an indication of expertise. Yet in spite of this indeterminacy the research methodology has also generated an unexpected and positive outcome in the form of direction.

The analytical direction of this project was altered by a research need to narrow the number of coaching decisions proposed by the research group. The stimulus for this reduction was to locate only those decisions that are most reflective of expertise. Consequently the entire range of decisions proposed by the research group were scrutinised according to a simple schematic plan for qualifying coaching decisions. At the centre of this schema were two defining traits; the type of decisions made by coaching practitioners and the associated value attached to these decisions by coaching practitioners. While this researcher is uncertain if any other formalised schema exists, this simplistic approach to qualifying the many decisions proposed by the research group achieved the desired effect. By categorising the decisions and classifying each category according to their value, the research was able to establish 'game day decisions' as the actions perceived by the research participants to be most reflective of expertise in

interceptive sport coaching. It is interesting to note that at this stage of the analytical process the category of ‘game day decisions’ would refer only to decisions made in the heat of formal interceptive games. However, later in the analytical process, this term will be reconfigured to ‘game play decisions’ to include the similar decisions that coaching practitioners make during opposed training sessions.

Once the anecdotes referring to ‘game day decisions’ were isolated from the wider body of responses, an axial coding process was employed to identify relationships shared by various anecdotes. This coding process uncovered valuable insight regarding the underpinning concepts that coaching practitioners use to generate decisions during interceptive play. These 3 abstract concepts will contribute significantly in part, towards the formation of a theory explaining how expert coaching practitioners fast track a decision making process.

The first of these abstract concepts is best described as a ‘Deep Understanding’ (see Ericsson and Lehmann, 1996; Coyle, 2009) of game conceptions and nuances. In the process of separating ‘game related decisions’ from the likes of administrative and training related decisions three members of the research group gave an indication of an expert coaching practitioner having a deeper understanding of the finer principles of the game. Research participants 1, 3, and 4 each associate expertise in coaching with the ability make sense and extract meaning from the most innocuous elements of interceptive play.

Research participant 1 elaborates on this concept of ‘deep understanding’ by comparing his understanding of modern defensive patterns with a widely publicised perception that one section of his team ‘can’t tackle’. In his analysis of these two contrasting views, research participant 1 gives notice that players who progress to this level of the game do not do so with glaring skill deficiencies (see C1.3). The implication behind this statement is that such a sweeping generalisation as ‘he can’t tackle’ only demonstrates a lack of understanding that the less experienced or skilled coaching practitioners have of the finer complexities of the game. It is the suggestion of this research participant that defensive errors are more likely to be the result of an opponent’s creative attacking flair rather than an individual defensive deficiency. Research participant 1 reinforces this point by suggesting all players are beaten in defence at one time or another and that it is the realm of the expert coaching practitioner to break down interactive play to identify the specific

reasons why the player made a poor defensive decision or made the right defensive decision too late (see C1.4).

In the anecdote above, research participant 1 is strongly proposing that expert coaching practitioners possess an enhanced understanding of how an interceptive game unfolds. It is the implication of this research participant that lesser coaching practitioners (and the wider public) may perceive interceptive play, as a series of discrete interactions punctuated only by the glaring error or moment of brilliance, whereas the expert coaching practitioner perceives interceptive play as a fluid exchange of cause and effect forces[8]. As a result of this fluid interpretation of interceptive play, the expert coach has the ability to identify, understand and consequently respond to the forces that produce the error rather than simply labelling the obvious (see C1.6).

Participants 3 and 4 reinforce the views presented by research participant 1 in the previous anecdote. Research participant 3 for example associates expertise with a coaching practitioner's deeper understanding of the finer details of specific points of attack. The precise nature with which research participant 3 discusses the purpose of specific lines of attack gives indication that an expert coaching practitioner will perceive a defensive formation as a rational construction of space and opportunities (see C3.7). In a comparable explanation of an expert practitioners 'deeper understanding' of interceptive play, research participant 4 labels the finer details of attack and defence and the associated interplay between these two forces as "field Knowledge" (see C4.4).

The second abstract concept that emerged from this set of research questions is concerned with a perception that expert coaching practitioners have the capacity to 'Read Play'. In a similar notion to that proposed by Schempp (2006) all six research participants alluded to a capacity for drawing inferences from relevant information that is extrapolated from the environment by a targeted focus of attention. Consequently, it isn't hard to understand why researchers and coaches alike have rendered much of what expert coaching practitioners actually do as esoteric (Nash et al., 2012). The postulation that expert coaches can determine the future intentions of an opposition by 'reading live interceptive play' clearly doesn't lend itself well to the tangibles of scientific investigation. However in spite of the nonrepresentational nature of this abstract concept all six research

[8] This notion of cause and effect forces will later contribute towards the stability instability exchange model.

participants made mention of an expert coaching practitioner possessing the capacity to 'read play' (see C1.6, C1.7, C2.7, C3.8, C4.7, C5.6, C6.4, C6.6).

This concept of 'reading play' was most obstinately presented by research participant 6 who asserts that it is the duty of an expert coaching practitioner to determine the intentions of an opponent (see C6.4). The position taken by this coaching practitioner is that the expert coach will use a heightened understanding of the game to read the movements of opposing players to determine their attacking intentions. This research participant perceives the role of an expert coaching practitioner in a similar vein to that of a non-playing captain. A knowledgeable entity that sits externally to the field of play, yet manipulates the actions of his on field players to foil the attacking raids of his opponents.

Anecdotes offered by research participants 2 and 4 similarly position 'reading play' as a skill set that contributes significantly towards a coaching practitioners capacity for making game day decisions. However the perspectives offered by these coaching practitioners makes reference to 'reading' the defensive reactions of their opponents rather than the attacking initiatives of their opponents as identified in the previous anecdote offered by research participant 1. Research Participant 2 suggests that while it is his players who make the initial decisions regarding the type of attack they employ and the targets at which this attack is sent, he will assess their choices and offer sage advice to ensure that maximum reward is gained from their efforts (see C2.7). Similarly research participant 4 also speaks of an opportunistic approach to generating game day decisions (see C4.7). In this anecdote the research participant suggests that his capacity for generating attacking decisions is enhanced by observing the defensive patterns and movements of his opponents.

While the wider population when describing the 'special attributes' of gifted coaches (and players) freely apply the term of 'reading play', the concept is often left unexplained. References that are similar or parallel to 'reading play' are plentiful in popular media however; there has been very little published research that attempts to explain what 'reading play' actually entails and how practitioners acquire such a skill set. As a consequence there is very little information to help build upon our existing understanding of this abstract concept. Yet in light of this conceptual paucity, a series of enmeshed comments regarding the notion of 'reading play' and the processes sustaining this abstract concept have begun to emerge from this set of research questions. What is most evident

from these comments is that a coaching practitioner's capacity for 'reading play' is enhanced by the extent of their preparation.

It is this reoccurrence of the terms 'preparing' or 'planning' in the responses offered by the research participants that has provided the stimulus for recognising 'planning' as the third abstract concept to emerge from this set of research questions. The concept of planning and using game plans is not a new. In fact elementary coaching education materials from the three interceptive sports used in this project all promote the use of planning in one form or another. However from the responses offered above we can deduce that coaching practitioners use game plans to enhance their 'decision making'. Research participants 1, 3, 4 and 6 have each provided some understanding into how coaching practitioners can generate decisions based on the objectives and hypothesis of their game plans.

Research participant 3 is the one member of this research group that is most palpable about the contribution of a game plan to his 'decision making' capacity (see C3.10). In the process of separating 'game day decisions' from the broad spectrum of decisions proposed by the research group, this coaching practitioner claims that unlike other pronouncements; information sustaining coaching actions such as decision making must be pursued. This point is further developed by the suggestion that as a coaching practitioner, he approaches every game (when possible) with a unique plan that identifies a number of specific attacking objectives. The inference made by this coaching practitioner is that he uses the game plan as a lens, searching for information that he can use to make judgements regarding his players' ability to adhere to the plan.

In a similar perspective to that of participant 3, research participant 4, and to a lesser degree participant 5, also identify a strong correlation between their planning and the decisions they make during interceptive play. In the process of detailing how he fulfils his duties as a high performance coach, research participant 4 suggests that he has 'trained himself' to focus his attention on the movements of his opponents rather than 'ball watching' (see C4.7 and C4.8). This high performance coach suggests that he can rationalise attacking opportunities and or the effectiveness of his players attacking choices by observing the defensive movements of his opponents. In this instance, participant 4 is suggesting that he generate decisions based on his own judgements of whether or not his team is achieving the attacking objective established in their training and game plans. Interestingly this notion of garnishing evidence from the movements opposing players to

fuel a ‘decision making’ process that makes judgements about his own players attacking ability resonates well with comments by research participant 5. Participant 5 suggest that it doesn’t matter if your decisions are proven right or wrong as the game is in a constant state of change, but what is most important is that you have a reason or evidence for making recommendations.

While research participants 1 and 6 also make mention of using a game plan as a means to identifying specific information streams, the detail in their anecdotes offer evidence of a second approach to generating game day decisions. As indicated above, coaching practitioners can produce decisions based on the objectives of their attacking game plan; however, participants 1 and 6 equally suggest that they produce decisions based on their understanding of what their opponent will do when in attack. In what can literally be described as an ‘Avant Garde’ approach to decision making, research participant 1 suggests that he will prepare his players to ‘look forward’ for the specific movements of opposing players that provide insight about the attacking intentions of their opponents. This insight affords the defensive team time to prepare an ‘advanced guard’ to negate the attacking strengths of their opponents (see C1.7). The intimation made by participant 1 is that by engaging a heightened understanding of the attacking traits of their opponents, an expert coaching practitioner will use a premeditated set of hypothesis concerning the attacking preferences and or strengths of their opponents as a filter of environmental information to fast track defensive decisions.

The intentions of this second set of research questions was to confirm whether or not decision making should be exposed to further examination as a potential indicator of expertise in interceptive sports coaching. However the detail of information uncovered in the responses offered by the research group has provided this project with a significantly greater level of momentum and direction then had first been anticipated. As a consequence of coding participant responses, I was able to establish momentum by confirming two valuable conclusions. The first of these conclusions was to determine that game day decisions were widely perceived by the research group as the actions that are most reflective of expertise in interceptive sport coaching. In concert with this conclusion, a second supplementary conclusion confirming that a professional need exists for further research examining how coaching practitioners produce decisions during interceptive play is also established.

The direction of this project was also surprisingly enhanced to by the three abstract concepts that were unearthed in the responses offered by research participants to this second set of research question. In the process of differentiating between the types of decisions that coaching practitioners make, some of the responses offered by research participants have provided valuable insight concerning how expert practitioners generate game altering decisions. While these three abstract concepts were unexpected, the notion of an expert coaching practitioner combining a 'deeper understanding' of the game with deliberate 'game plans' to read interceptive play will certainly provide a firmer focus of attention for this project.

5.5. Participant responses to research question 1.3

How do these expert practitioners make decisions?

The planning for this third set of research questions had benefited greatly from the conclusions previously identified in the first two sets of research questions. The three abstract concepts identified in the second set of research questions suggest that coaching practitioners merge environmental information streams with domain specific knowledge structures as a means of extracting a higher order of understanding of interceptive play. This coalescing of interceptive action with established knowledge structures as a means of generating decisions resonates heavily with the Ecological Psychology conception of perception action coupling. Identified in Chapter Four as the most recent of four research paradigms to analyse expertise in sports performance, Ecological Psychology espouses a nonlinear approach towards better explaining abstract concepts such as 'reading play'. Consequently, this third set of research questions were designed to determine if any tangible process could be found to explain how coaching practitioners couple live interceptive action with domain specific knowledge structures to drive a decision making process. Of particular interest was where the information sources that coaching practitioners use to generate these decisions originate and how these information streams are used to generate meaning.

The snippets of responses offered below are indicative of the replies offered by the research participants to this third set of research questions that were addressing how coaching practitioners generate decisions or a decision making process.

C1.10 - I don't have to make up something [to say], I know these guys and I know what they're doing. I just have to follow the game and look for a sign of what's going to happen, what's working and what's not working

C1.11 - It's not difficult, not if you're watching the game [as opposed to watching the game for enjoyment] every movement, every line serves a purpose.

C1.12 - Well think of it as risk. Each pass [In attack] increases the risk, the greater the risk the more likely we are not going to complete the set. The game is going to give me ten metres every time we play the ball – with next to no risk. You can call me boring but we make forty or fifty metres with no risk (by reducing the number of passes thrown and the length of each pass thrown) and [then] kick it another forty or fifty, but we win because we reduce the risk.

C1.13 - They all have great hands at this level, but we still want to reduce the risk before we go wide and when we go wide. They shouldn't take risks unless they can see something.

C1.14 - It's pretty hard to pull [player's name] and [player's name] down, particularly with the lines that they run [Their size and speed combined with the angles they run reduces their risk but forces the opposition to take some risk]. The trick [to limiting and creating risk] is knowing when to change [player's objective] from field position to body position. It's all about reducing risk for [player's name who is a wide attacking player]. We want to draw them [the opposition's defensive player] in, open up some space out wide for [player's name] and try and get him one on one with some space.

C1.15 - There aren't any [defensive] holes at this level, you have to create half holes and hopefully we will be sharp enough to make the most of them before they close.

C1.16 - You don't have to have the ball, if our decoys are doing their job [completing their role], they're invaluable and there is no risk to what they do [describing how to reduce risk by reducing the number of defenders available to commit to a tackle].

C1.17 - Well it's the same principle, just flip it around. We hope that we're ready for them and force them to increase the risk. We'll know what they want to do but we try and change that. Make them pass [more often]; pass wide too [entice the opposition to throw long passes].

C2.8 - Personally I am looking for two points of deception. I am always asking myself if we used the right play at the right time, in the right place [on the field] and at the right targets.

C2.9 - These are my rules for working out whether we are on track [creating opportunities].

C2.10 - It all comes down to field position. I look at the plays we are using and where we are using them. You know you don't want the boys throwing twenty metre passes coming off their own line equally you don't want your ball players taking on the pigs without runners.

C2.11 - Well you don't want to give up field position cheaply. We all want to score, well in reality that is a very difficult thing to do. So our first job is to win field position before handing over the ball. If we do this well we can put them under pressure and hopefully force them to hand over possession.

C2.12 - The messages that I send out, what I say at half time and even after games and at training, they're all about how we use win and lose position on the field.

C2.13 - I constantly reinforce in my boys four questions that they must ask themselves: Where are we? Where do we want to be? How are we going to get there? What's my job? Everything that I say relates to these. It keeps us on the same page.

C2.14 - I study every team, to get a better understanding of their likely pattern of play. It's like a glass ball (the four questions), their shape tells me what to look for and it helps me explain thing to the boys

C2.15 - We should be sending our decoys at the players we think we can force into error, the players who are too slow to adjust or who get caught in the wrong position. Or it could be more long term. Sometimes we will target a specific player to tire him [tired players fail to work cohesively in defence or to nullify his attacking sharpness].

C3.10 - In our last [representative] game I had no idea of what we were up against. So we started the game by switching channels after each phase [to test their shape], I am looking for how they adjust, do they slide or regroup, do they play a set structure, I am looking to see how fast they are, looking to see if they are hiding someone, there defensive shape, those sorts of things.

C3.11 - Usually you know what you're up against and you can be more proactive. You can set your defence and prepare for them; you look for something [their depth or their shape] that can lead you to put pressure on their playmakers.

C3.12 - It's like a big game of chess, things just don't happen. Well they do [just happen] but you can't rely on that [things just happening], not if you hope to win anyway.

C3.13 - It's all coaches talk about lately, repeat phases, maintain possession, but you need to make things happen and that starts with winning the energy battle.

C3.14 - No there's no certainty, but you can improve your chances by attacking with a purpose. There is not much point at playing to their strengths. Even if we get it right, there is still no certainty that we will get the result that we're after, they might read us or adjust better then we attack.

C3.15 - It's all about forcing errors or making errors. You tend to make more errors when you're fatigued and you fatigue more quickly when you're forced to defend. We want to keep possession of the ball.

C4.7 - It's much harder in games [less time to make decisions during a game]. I have trained myself to watch the other team [opposition] especially when we are attacking.

C4.8 - … but they [administrators and spectators] don't understand. Everything that we do with the ball has a reason. I'm looking at how they line up, to see if we can move them [away from their defensive pattern], isolate someone, create an opportunity [to exploit] or not.

C4.10 - We are always talking about reading play, things we recognise, you know as players and as coaches, but when you're on the line you got to make sure that you're reading the game not just reacting to it. That's the difference.

C4.11 - There is always info. You got to be able to see it, to read between the lines. When you can see the signs and understand what it means you can get in front.

C4.12 - To start with you have to see the game as a struggle for [field] position and you get position by using well your time with the ball. You might need to work over their forwards, change the way they want to play it, like make them commit more players to the ruck. If they are a big side you play an expansive

game and avoid set restarts. That's what I am looking at, how effective are our plans at working them over.

C4.13 - If you haven't got the ball? You need to hold your position and force them to change theirs, go around you [attack away from their forwards] if they want to play tight, or over you [kick for field position] if they think they can go through you, either way you need to control the both aspects of the game.

C5.11 - You use your game plan, you have some goals and work out how to achieve these. You have process goals [specific to each player] and you watch to see if they are putting these into practice the way we planned. Or if our goals are good enough to do the business?

C5.12 - The best team doesn't always win. The team that best plays to their strengths and away from the strengths of their opponents usually wins.

C5.13 - Well [International opponents] is a much better football team then us, their skills were much stronger than ours, but we were fitter and much bigger. So we try to make them play from outside and off the ground. We didn't want to get dragged into a man to man defence situation – they would have destroyed us with their ball control and speed. We gave them space but covered the internal access points.

C5.14 - Yes that's the key to good communication, I prepare for each [attacking] phase for every game. This is all based on how we are completing our plans, our goals, if we are using the right processes. Are all my [players] completing their assignments? And it probably ends with trying to figure out how to better disrupt their defensive shape. That's the key to good communication.

C5.15 - First we have a basic understanding of what they will do with the ball, we knew where they would want to move the ball. So we prepared for the ball going into these spaces, we tie it up, we're ready to make the tackle. [and] If they breached our red zone we compressed our shape and pushed them to the fringes.

C6.9 - In this game it's what you do off the ball that counts. More often than not the whole game revolves around who can best create and use space. That's why you can only plan your attack to a certain point before ability, speed or even vision simply takes over. We have to read their D [defensive shape] to find the players we want to target and test it. You don't test the pattern you test the

players. We got to create space, create an opportunity to have a shot before we can hope to capitalise on it.

C6.10 - You look at what they have got and you try and move the right people into the right places. You're trying to establish a numbers [more attackers then defenders in one space] or spatial advantage [created space for an attacker to drift into unimpeded].

C6.11 - You focus on creating an opening [space]. That's the whole idea behind a 'through ball', Laying off' or 'knocking in a cross'. Every coach plays the odds. Get as many quality shots on goal as you can and let your ball players do their thing.

C6.12 - It's what you do off the ball. This is the most complex form of football. Anyone can play it, but you really have to understand it to play it well.

C6.13 - It is the same with coaching. You will fail if you really don't know the ins and outs of the game. You might know every drill in the manual but if you don't know what each one means or what each one is trying to do, then it's useless. You know you see it all the time in places like this (community based club), pinning your hopes on the big kid or locking your best footballer in the striker's shirt – no point if they can't give him the pill in space.

C6.14 - It's more difficult in defence. It's about closing down spaces before we get punished. Look at [player's name], they don't think he is too flash, but I would pick him every time. Look at how he always positions himself to the back inside of his man, he is ahead of the game, he gives just enough space to encourage the pass but not so much that he can't win possession or be beaten. He's not just watching the ball he is speculating on where the forwards and wingers are going.

C6.15 - In attack it's all about moving to open space but defence is all about knowing and understanding the movement of your opponents to shut space down.

C6.16 - We do train for it, all the 3 on 3, 3 on 4 grid games are about reinforcing in the boys how to open and shut space down. We open it by moving off the ball and into vacant spaces and we shut it down by closing the angles and controlling where an attacker can move the ball.

5.5.1. Discussion of participant responses

While the collection of responses above is very much a condensed sample of the complete data set, three distinct consistencies are still evident in the responses offered above. These three consistencies are:

(a) The interplay between traditional elements of a coaching practitioner's skill set,

(b) The use of a personal coaching analogy as a lens for filtering environmental information.

(c) The application of this coaching analogy to generate decisions.

The first of these three consistencies has briefly been addressed in the previous results and discussion section. However, the implications of a more complex application of this information warrant a more detailed discussion. Traditionally when coaching practitioners and researchers are asked to elaborate on the notion of expertise, most pundits restate the usual features of a coach's skill set. Carter and Bloom (2009) suggest that the most prevalent of these qualities in contemporary research are the concepts of skill, technique and tactics. In a more generic sense, it is often universal traits such as communication and depth of knowledge that are most often associated with expertise (Cassidy, Jones and Potrac, 2004). However, from the responses offered to this last set of research questions there is now evidence to suggest that expert coaching practitioners utilise an advanced application of multiple concepts to further enrich their understanding of interceptive action.

The responses above are littered with examples in which the research participants suggest that they engage analytical skills to blend knowledge structures as a means of generating informed decisions. From a Positivist perspective, some may draw a shallow association between this interplay of skills and knowledge with Côté et al., (1995) notion of 'Mental Models'. However, the responses above suggest that the product of this amalgamation of analytical skills and interplay of knowledge is indicative of a larger and more complicated knowledge structure then that originally proposed by Côté and colleagues. Moreover, this idea of a more complicated knowledge structure resonates strongly with what Banks and Millward (2007) describe as 'strategic knowledge' and Abraham et al., (2006) and Côté et al., (2009) describe as 'conceptions'. In contrast to the beliefs of cognitive psychology which propose only declarative and procedural knowledge, Banks et al., (2007) describe 'strategic knowledge' as a third and more complex knowledge structure that involves a practitioners' understanding of overriding strategies and how and when they apply. In a

similar fashion, the participants involved in this study also describe actions that originate from a deeper understanding of two or more declarative or procedural knowledge structures (conceptions) i.e. ‘principles of play (see C1.13)’, ‘strategic awareness’ (see C5.14) and ‘knowledge of individual attributes’ (see C3.11).

As helpful as a third knowledge structure may appear for determining how information is organised and accessed by expert practitioners, Bennie and O’Connor (2010) remind us that such eccentric calculations are fundamentally unique to the humanistic ideals that frame an individual’s ability to interpret situations. Yet despite the warning of Bennie and O’Connor the relevance of a third and more dynamic knowledge structure is still rendered most pertinent to this research when we consider the responses offered by research participants that involve reading interceptive action. All six research participants offered responses that would allude to a process of enriching their conceptions by constantly modifying them according to the information that they garnish from the field of play (see C1.11, C2.10, C2.14, C3.11, C3.14, C4.7, C5.15, and C6.9). Subsequently, mindful of the Bennie and O’Connor (2010) caveat, but in acknowledgement of the interplay between conceptions and conceptions and environmental information, this researcher has labelled the aforesaid process of blending conceptions and the process of using environmental information to enrich these conceptions as formulating (idiosyncratic) conceptualisations of interceptive action (see section 7.1.4. page 185) and the use and maintenance of these conceptualisations as an ‘Extended Domain-specific Knowledge Structures’.

It is not difficult to draw the link between this notion of engaging environmental information to inform and modify existing conceptions and conceptualisations with the developing discourse surrounding self-organisation and complexity sciences. Araujo, Davids and Hristovski, (2006) describe expert coaching practitioners as those that can identify and engage with environmental affordances for the purpose of allowing decisions for action to emerge from this interplay between the organism, the environment and the act itself. Research participant 4 reinforces this point in his suggestion that there is always information available to coaches (see C4.11). This research participant further develops his point by suggesting that a true testament of a coaching practitioner is being able to recognise the information streams and understand what each piece of action means.

While all six members of the research group have indicated in their responses to using various combinations of the aforesaid three conceptualisations (see C1.13, C2.8, C3.12,

C4.7, C5.14, and C6.11) the argument explaining their use is most clearly presented by research participants 1, 5 and 6. As mentioned above, each of the three larger consistencies has a well-researched history; albeit research that is predominantly framed by cognitive psychology with a positivist episteme, and as such the role and contribution that these conceptualisations play in coaching practice is well documented. However, by recognising and understanding the interplay that can occur between these traditionally isolated knowledge structures research participants 1, 5 and 6 suggest that they can attain a forward looking analysis of interceptive action.

In the process of explaining how he generates decisions, Research participant 1 provides a suite of explanations that indirectly weaves a connection between all the three of the aforementioned conceptualisations. Though rather than offering any explicit process or explanation regarding how this contextual relationship of conceptualisations is used to generate decisions, this coaching practitioner offers a sweeping generalisation that serves to reinforce his perception of coaching practice being an art form rather than a discernable practice (see C1.11). However this 'tongue in cheek' suggestion offered by research participant 1 regarding an actual difference between observing interceptive play as opposed to watching it for enjoyment provides a foundation for identifying and analysing the contingent contributions of each conceptualisations.

Initially in the process of explaining how he observes interceptive play, research participant 1 makes explicit reference to his advanced and pragmatic understanding of the game (see C1.12, C1.15). In a period of time in which coaching practitioners and social commentators talk readily about the complexities and nuances of interceptive sports, comments made by this research participant regarding his ability to analyse how the game is played appear conceited (see C1.11). However, to accept this response as self-serving or even simplistic would be a grand understatement. In fact research participant 1 offers this simplistic interpretation of interceptive play as evidence of his deep understanding of both the core principles of the game and the strategies that maximise the opportunity afforded by these principles. Further to this a more complete picture of this coaching practitioners knowledge set is offered in subsequent responses that demonstrate how he integrates this deep understanding of the game with the finer principles of play (see C1.14) and the personal attributes of individual players (see C1.15) to achieve a more meaningful understanding of interceptive action.

Likewise in response to this third set of questions, research participant 5 offers anecdotal evidence that also makes intimation of a connection between conceptualisations as a sustaining feature of the process used to generate informed decisions. Research participant 5 quite concisely draws a contextual relationship between the use of game plans and physical attributes of players to fast track the calculation of decisions (see C5.11 and C5.12). The suggestion made by this coaching practitioner is that he carefully considers the physical attributes of his players as well as his opponents and uses this knowledge as a basis for designing game plans and specific strategy that will enhance his team's probabilities for success (see C5.13). The value of this connexion however, is made most relevant to this research project by the indication that this research participant uses this conceptual edifice to establish specific 'process goals' (C5.11). These individualised process goals are then used as a lens to determine individual performances and ultimately as a touchstone for critically reflection of strategies and game plans.

In a similar fashion to participants 1 and 5, the responses offered by research participant 6 indicate that he also blends conceptualisations as a means of harnessing a greater understanding of live interceptive action. However, the process that this coaching practitioner instinctively uses is more aligned with that of research participant 1 then participant 5. As indicated above, participant 5 engages a methodical process that amalgamates planning and strategy with the physical skill set of players to create personalised assignments. Research participant 6, like participant 1, engages a decision making process that is born from a deep and all inclusive understanding of the game (see C6.12). Participant 6 uses this comprehensive knowledge structure as an ignition mechanism to measure the player configurations of opposing teams (see C6.10). Once he has established the rudimentary intentions of his opponents, research participant 6 will use this informed estimation to determine the strategies and principles of play that are likely to be used against his own team (see C6.9, C6.10 and C6.11). Furthermore this coaching practitioner then uses the conclusions of these blended conceptualisations to confirm his appraisal by applying an extensive understanding of the attributes of players to locate the origin of attacking threats or defensive weaknesses (see C6.15).

The second consistency to emerge from the responses above is principally concerned with the analytical connotations that accompany the previously raised conceptualisations. After reviewing the responses, it became apparent that each research participant distinguishes expertise in interceptive coaching as a pre-emptive engagement with live

interceptive action. Interestingly, the research participants presented this notion of anticipatory practice as an extension of the traditional retrospective analytical skills of coaching rather than as a replacement. This point is most clearly reinforced by research participant 4 who states that coaching practitioners need to ensure that they are reading the game and not only reacting to events that have already occurred (see C4.10, see also C3.10). With this in mind it is suggested that while coaching practitioners may need to act retrospectively, an active and ongoing analysis of live interceptive action is required to generate forward looking decisions.

The idea of an ongoing analysis of all the information available in interceptive games appears an onerous task. So onerous in fact, that Côté et al., (1995) has previously suggested that expert practitioners employ personalised 'mental models' as a means of acquiring an accurate understanding of action. Côté et al., (2009) would later refine this concept of mental models to suggest that expert coaching practitioners use model of 'Integrated Knowledge' to extrapolate an enhanced awareness of interceptive action by networking interceptive action with experiential and declarative knowledge structures. Similarly, Abraham et al., (2006) have proposed that expert practitioners use 'conceptions' as a mechanism for merging action with coaching knowledge for the purpose of fast tracking awareness. While it appears logical that expert coaching practitioners employ a filtering mechanism, of some description, to help locate and analyse the most pertinent sources of information. Currently very little is known about how coaching practitioners filter environmental information and use this information to generate informed decisions.

In spite of this ambiguity, the responses of research participants 1, 2, and 4[9] can provide some insight into this notion of filtering environmental information. Each of these research participants has inadvertently made reference to conceptual analogies as a means of interpreting interceptive action. However, unlike the models proposed by Côté et al., (1995; 2009) and Abraham et al., (2006), the research participants of this project have offered some insight into the design of these conceptual analogies and how it is that they function.

[9] All research participants offered anecdotal evidence that implies a use of personalized emblematic analogies; however only three are offered in the main document. Research participant 3 proposed an analogy centered on a 'energy battle'. Research Participant 5 raised a personalized analogy centered on the 'interplay of strengths and weaknesses' and research participant 6 raised a personalized analogy that focuses on 'creation and use of space'.

In accordance with the views offered by the aforementioned research of Côté et al., (1995); Abraham et al., (2006); and Côté et al., (2009), the data collected from this research confirms that expert coaches choose to avoid the impractical task of independently analysing each and every aspect of interceptive play. While this conclusion appears to only replicate the findings of earlier research, a deeper understanding of how expert coaching practitioners achieve this can be found in the design of these conceptual analogies. The first deduction that can be drawn from the design of the conceptual analogies is the consistency for each to adopt an emblematic interpretation of their respective interceptive sports. Rather than analysing each and every aspect of interceptive play in isolation, research participants 1, 2, and 4 each suggest that they interpret interceptive action through a conceptual analogy that collectively represents a number of performance and process goals (internal conceptualisations, page 174). The second deduction that can be drawn from the design of these conceptual analogies is that each prioritises a proactive pursuit of these performance and process goals as an indicator of success rather than an arbitrary result. The third and final deduction to be drawn from the design of these conceptual analogies is the give-and-take feature (external conceptualisations, page 172). Rather than perceiving attack and defence as two isolated features of interceptive play, each of the conceptual analogies employed by these coaching practitioners perceive these facets of interceptive play as a singular reciprocal even dialectical exchange that underpins their emblematic interpretation.

This use of conceptual analogies is clearly noticeable in the responses offered by research participant 1. This research participant unintentionally implies that he analyses interceptive action according to a risk analogy (see C1.12). This highly regarded coaching practitioner (initially) suggests that he interprets interceptive action through the capacity of his players to achieve performance related goals within a minimal range of risk (C1.17). While such a ‘risk analogy’ may appear not too dissimilar to any other coaching philosophy, this particular analogy unfolds to embrace a non-linear perspective by recognising the involvement of a third party – the opposition. In the process of describing his risk analogy, research participant 1 provides a very practical example of the give-and-take feature of these conceptual analogies. Research participant 1 suggests that risk presents itself continuously in every facet of the game and as such implies that his players must calculate risk ‘on the run’ by finding a balance between performance goals and process goals (C1.14). The determining feature that this coaching practitioner uses to

validate a players action, is whether or not the risk taken by the player correlates with the loss or gain of momentum.

In a similar vein to that of research participant 1, research participants 2 and 4 each suggest that they too analyse interceptive action through conceptual analogies. The conceptual analogies used by these two practitioners are each built around symbolic interpretation of their players engaged in an on-going 'struggle for field position'. In this instance, research participants 2 and 4 each suggest that they interpret their respective brands of interceptive sport as a constant 'struggle for (field) position' with an opponent who plays with a similar purpose (see C4.12 see also C2.10). As such these coaching practitioners are constantly scanning for indicators of information, from either aspects of a single piece of interceptive play, which will act as a key to unlocking the reasons or opportunities for their team gaining or losing field position. Fajen et al., (2008) describe this process of searching for give-and-take information as the 'reciprocity of perception and action'. Perception and action perpetually feed one another and research participants 1, 2 and 4 have each demonstrated an ability to seek and use this source information to fuel a greater action.

The models and conceptions offered by researchers such as Côté et al., (1995); Côté et al., (2009) and Abraham et al., (2006) have described physically what it is that expert coaching practitioners do. However, this research project has been able to look beyond this and gather valuable insight regarding how it is that coaching practitioner actually observe and analyse interceptive play. While the anecdotal descriptions offered by research participants were initially intended to illustrate the functional purpose of their conceptual analogies, they can now unexpectedly offer a subsequent and greater purpose. These anecdotal descriptions have given indication of a third consistency emerging in the responses offered to these research questions. This third consistency provides a formative understanding of how coaching practitioners use the information garnered from these conceptual analogies to generate informed decisions.

This subsequent and final consistency uncovered in the responses above provides some insight into how expert coaching practitioners use the information gathered from the conceptual analogies to generate decisions. Leaning heavily on the previously discussed coaching knowledge structures and coaching conceptualisations, this third consistency demonstrates how these research participants have intrinsically created two unique

processes to generate decisions. The unique nature of these processes lies within the selection of these conceptualisations and the order in which they are used to make sense of interceptive action. More explicitly, this diversity between these two unique processes can be attributed to whether the coaching practitioner is generating attacking or defensive related decisions.

If we are to simultaneously compare the responses offered by the six research participants, then there does not appear to be any pattern that could universally account for how the information gathered by the conceptual analogies is used to generate decisions. However, in spite of this variance there is considerable replication in the procedural details offered by each member of the research group to explain how they generate decisions. For example there have been many references throughout the interview process to an assortment of coaching related knowledge structures and various conceptualisations. There have also been a great number of references to a professional need for expert coaching practitioners to actually search ahead for specific pieces of information. Yet regardless of these reoccurring details, the boldest consistency to emerge from this data set is the fact that each member of the research group provides a different representation of their own decision making process. However, it would be negligent to assume that a more meaningful interpretation of a coaching practitioner did not exist in subsections of the research group.

Recognising the futility in searching for a theory that universally explains the mysteries underpinning every decision ever made by every expert coaching practitioner, Strauss and Corbin's Conditional Matrix (1998) was engaged to locate meaningful consistencies in the data set. The strength of this Conditional Matrix lies within the axial coding phase and specifically its use of the coding paradigm that advocates for a sectional analysis of reoccurring data. This sectional approach enables the researcher to focus on the consistencies in processes that underpin subsections rather than trying to extract impalpable consistencies from a broad data set. Consequently, by isolating the replicable details from the anecdotes offered by research participants 1, 2, 3 and 4 we can begin to see how this subsection of the research group processes information that generate decisions addressing attacking related issues. Alternatively, by isolating the replicable features of the responses offered by research participants 1, 3, 5 and 6 we can begin to see how this subsection of the research group processes information to generate decisions that are orientated around defence.

By establishing both attacking and defensive decision making subsections we can begin to recognise the diversity between these two unique processes as the distinguishing feature of a decision making process. To further demonstrate this point I will examine the two unique processes independently, beginning with the process used by research participants 1, 2, 3 and 4 to describe how they make decisions that are attack orientated. This will be followed by a discussion of the process used by research participants 1, 3, 5 and 6 to generate defensive orientated decisions.

The process of understanding how the research participants generate attacking decisions is made easier by acknowledging two underpinning features that regularly appear in the responses offered by these four research participants. First, it is suggested by this subsection of the research group that each attacking decision that they make is tied to a well-planned and purposeful attacking strategy. Research participants 1, 3 and 4 each reaffirm this point by declaring that their attacking game plans are founded on a belief that they must create their own scoring opportunities (see C1.15, C3.13, C3.14 and C4.8). This notion of using purposefully designed attacking strategies to create scoring opportunities leads to a second underpinning feature regarding the origin of attacking decisions. Based on this premise of using a well-planned and purposeful attacking strategy, it is inferred that a coaching practitioner's decision making process is initiated well in advance of a game commencing (see C1.10, C1.17, C2.14, C2.15, and C3.11)

This idea of a decision making process commencing prior to any piece of interceptive play actually unfolding was drawn from the admissions of research participants, that expert coaching practitioners engage in an analytical review of opponents prior to playing them (see C2.14). This point is reinforced by research participants 1, 3 and 4 who each imply that they have familiarised themselves with their opponents prior to games (see C1.10, C3.11 and C4.8). However, while this notion of a pre-game analysis of an opposing team is not an example of new or revolutionary coaching practice, how coaching practitioners acquire and apply the products of this analytical review to generate attacking decisions is of logical interest to this project.

Relying on volumes of experiential knowledge acquired from both formal and informal coaching education experiences, expert coaching practitioners analyse the past performance of their opponents to establish a number of conceptualisations (refer to page 13) that frame perceived strengths and weaknesses (see C2.14). Using these

conceptualisations as a guide, expert coaching practitioners will formulate a game plan built around a number of attacking strategies. Each game plan is unique and dependent upon individualised player assignments that are complete with performance and process goals (see C5.11). Each attacking strategy is designed to purposefully expose and exploit these preconceived weaknesses. The expert coaching practitioner will then transfer this network of plans and strategies into a suite of physical 'signs', like defensive 'shapes' presented by opposing players that are easily recognised as possible attacking opportunities (see C1.10, C3.11, C4.11 and C4.12).

This process of using physical signs offered by the research participants is consistent with the research of Ferrari et al., (2008) who suggest that experts use cues that enable them to focus on only the most important strategic formations presented by an opponent. As such it is the suggestion of these research participants, that coaching practitioners generate attacking decisions by initiating a process that commences with an analytical review of opponents. The purpose of this review is to identify and memories recognisable formations or defensive patterns that they can correlate with specific attacking opportunity. With these signs and shapes logged to memory prior to the commencement of play, the coaching practitioners is free during the game to scan the defensive movements of their opponents, searching for these recognisable signs and shapes of defensive patterns. It is further proposed that these signs and shapes which are created by the attacking team and offered by defensive players are the keys to information that the coaching practitioner can use to determine the effectiveness of his players, their ability to adhere to the process goals and his game plans. This notion proposed by the research group that coaching practitioners generate decisions by scanning interceptive action for recognisable signs of opportunity is reinforced by research participant 2 and 3. Research participants 2 and 3 both propose that they view the defensive configurations offered by opponents to determine possible attacking opportunities (see C2.14, C2.15 and C3.10).

From the responses above it is evident that a procedural approach can be drawn to explain how coaching practitioners generate attacking decisions. Conversely, the same procedure does not suitably explain the formation of defensive decisions. Consequently a second but extremely comparable process has been drawn from another subsection of the research group (participants 1, 3, 5 and 6) that collectively describe how coaching practitioners generate defensive orientated decisions throughout a game. The very comparable nature of these two processes negates the need to describe the defensive

decision making process in its entirety. It would prove superfluous to describe the underlying features of the defensive decision making process as they are the same features that underpin the attacking decision making process. The only difference that separates these two decision making processes if the order in which they apply the key features.

As mentioned above the two processes described by members of the research group share a good number of key features. The first of these similar features is that both processes share is that they each advocate a heavy dependency on an analytical review preceding any interceptive play. In fact all research participants suggest that a defensive decision making process, like the attacking decision making process before it, is initiated well in advance of any interceptive play actually occurring. From the perspective of a defensive decision making process however, this point is more strenuously made by participants 1, 3 and 5 who directly suggest that they proactively prepare for the attacking prowess of their opponents by trying to read and disrupt their attacking strengths (see C1.17, C3.11 and C5.15). The second feature shared by both processes is the use of configurations of opposing players as a source of identifying meaning through domain specific knowledge structures. Research participant 6 most clearly demonstrates how coaching practitioners, and players, identify the collective movements of opposing players as a key to unlocking specific domains of knowledge that inform the defender of the attacking intentions of an opponent (see C5.15, C6.9 and C6.14).

However, regardless of the similarities between the features of an attacking decision making process and a defensive decision making process, the two processes are quite different. The most notable difference lies in the purpose underpinning each decision making process. As mentioned above the motivation behind attacking decisions is a need to creating attacking or even scoring opportunities (see C1.15, C2.9, C3.13 and C4.8). Whereas the impetus for a defensive decision, is more concerned with establishing an advanced guard that intends to subvert imminent attacking plays (see C5.13 and C6.14). As a consequence of this diversity in the purpose sustaining each decision making process, another notable difference emerges in the order of involvement of two key features between the two processes.

While both decision making processes are initiated well in advance of any interceptive action, the sequence in which each process applies the key features of ‘domain specific

knowledge structures' and 'configurations of players' to generate game day decisions is reversed. For example, an attacking decision stems from a calculated process that requires the coaching practitioner to apply domain specific knowledge structures to live action. The purpose of this strategy is to manipulate the defensive structure of the opposition. Consequently the coaching practitioner is searching for specific configurations of opposing players that can represent fractures or possible fractures in an opposition's defensive line. By contrast however defensive decision require the coaching practitioner to scan the opposing team attacking configurations for key qualities that can be translated to specific lines of domain specific knowledge structures.

5.5.2. A summary of the responses and discussion of research questions 1.3

For organisational reasons only, the findings from this third set of research questions have been presented above as three separate realities. The three realities that have been discussed in this section include: the interplay of tradition elements of a coaching practitioners skill set; the use conceptual analogies to view and decode interceptive action; and the identification of attacking and defensive decision making processes. The presentation of each of these realities in isolation to one another is far from reflective of the role that each plays in the coaching practitioners' decision making processes. In fact, each of these three realities shares a symbiotic role in the decision making processes employed by coaching practitioner. However, it was necessary to present each reality individually to avoid over complicating an already abstract concept.

If we attempt to explain the symbiotic relation between these three realities, then the answer would lie in the fact that each reality is deeply embedded in the preceding reality. For example, a defensive decision making process requires the recognition of predetermined configurations of players. Each configuration of players is representative of a conceptualisation. Each grouping of conceptualisations and in fact each conceptualisation is an individualised dynamic representation of two or more traditional coaching concepts[10]. To ensure the coaching practitioner recognises each configuration and conceptualisation, amid the myriad environmental informational available, a

[10] The list of coaching concepts raised in this project include (but is not limited to): Strategy, Principles of Play, Player Attributes and Coaching Sciences

conceptual analogy is used by the practitioner to draw their focus of attention to the most appropriate streams of information.

The symbiotic relationship between these three realities is just as crucial to the process used for generating decisions when in attack. For example, an attacking decision making process requires the application of predetermined conceptualisations by players. Each conceptualisation is the product of a specific grouping of tradition coaching concepts. These conceptualisations are presented and understood by the players and coaches as performance and process goals. As interceptive action unfolds the expert coaching practitioner will then filter and analyse all the environmental action through a conceptual analogy. In attacking orientated decisions, the conceptual analogy is used by the practitioner to aid in the identification and comprehension of specific configurations of defensive players.

5.6. Participant responses to research questions 1.4

Can we use this knowledge to expedite the development of expertise in potential coaches?

Each of the decision making processes mentioned above are a conglomeration of anecdotes and ideas more so then a specific process that was described verbatim by all research participants. Consequently it would have proven futile to ask individual research participants if and how we could use these processes to fast track the development of interceptive coaches. As such this final set of research questions focuses the issue of how individual features of these decision making processes could be used to fast track the development of expertise in interceptive sport coaching.

Accordingly the extracts of responses presented below are indicative of the replies offered by the research participants to this final set of research questions. The extracts presented below are the research participants' reflections concerning the development and application of the underpinning features underpinning the aforementioned decision making processes.

C1.18 - I think we've got it about right [asked about developing a coaches], but not everyone can coach.

C1.19 - It's not a science. You can't just do a course, blow a whistle and become a coach. You've got make some mistakes; I have made every mistake in the book. I've just been smart enough not to make any of them twice. You can't just retire [from national competition] and start coaching at this level.

C1.20 - Well there's a lot more to it, you learn about attack when you try and stop the best attackers. I am not that smart, you can see who I have there beside me. I talk to him [mentor], he tells me what he thinks about what I have done and what he would do.

C1.21 - You've got to do your homework, and that's not reading the newspapers. I know their key players and I know who they like to go to, so I am looking to see where they position themselves on the field. I know what [his players' names] are capable of and I know how they can cause certain players some grief, so I already know what I am looking for.

C1.22 - You learn to apply it by being involved in the game. This is my life; I've worked at five (elite) clubs, but I didn't start there. People forget how many years I spent in the lower grades of Brisbane

C1.23 - Sometimes I've succeeded and other times I've failed but I have always tried to work out why it happened, I am constantly thinking about coaching.

C1.24 - I didn't think of it [asked about the risk analogy]. That's the rules of the game. You don't need to complicate it you just have to understand the game and play to the rules.

C2.16 - No it is just something you have to go and do [asked about formal coach education]. They do help when you're starting. When I did my level 2 that's when I really started to think about it. It took me a while but I realised that it was the same as the first course, but you had to think more about it, you know you had to use it. If you think about it, how many coaches can actually tell you the point of a drop off or a back field option or can tell you how to beat an up-an-in defensive pattern?

C2.17 – My degree and the time I spent working as a [another profession]. That has certainly helped me. I think I'm a much better communicator and problem solver because of it.

C2.18 - I try and pick up something from every coach that I have worked with. Sometimes it's something completely new, other times it might be a new approach to something I already knew.

C2.19 - You never stop thinking about ways to beat some type of defence. Sometimes you try it at training, other times straight in a game. But you always have to discuss the outcomes with your player.

C2.20 - I have been working on those four questions for a couple of years now. I first got the idea from [name of former head coach] who kept asking the boys to think about their job. I thought it was a good idea but he never really spoke about their jobs, you know he didn't make it clear. I thought it would work better if I spoke about their individual jobs as I coached them.

C2.21 - It started with me defining the job of every position on the field. Then it became a written description for every player before every game. Now it's four questions and three positions. I only play three positions – you can't micro manage a team game like this. The information is important I just had to find a better way of getting my message across.

C2.22 - That's part of the job (asked about the two points of deception). There are no easy games at this level. Some clubs might have a better playing roster then others, but they are all really well prepared. As a team we identify what we think are our opponent's weaknesses, we use Prosport (software) to show these to the players, then we run through it with passive opposition then active opposition. But this might all change come game time so we also prepare for adjustments and reactions.

C2.23 - Breaking down your opponents is easy if you really know the game, you're searching for the things they don't do too well or that their players don't do so well. Creating attack is another matters altogether. Perhaps coaching courses should spend more time on creative thinking for real defence.

C3.16 - Well they (formal coaching education) made me a better player. I always wanted to be a teacher, I was thinking about the priesthood. I really got a lot from (secondary schooling). All the Brothers were fantastic and I wanted to do what they did. Coaching seemed to be the way I could combine my love for teaching and sport. Every experience that I have had has made me a better coach.

C3.17 - For me, it got me thinking about the game, before that I just played it. About that time I started coaching with (name), he helped me a lot over the next 5 or so years.

C3.18 - What's that saying 'Necessity is the mother of invention', or something like that? You don't learn to think about coaching until you really need to. When you need to find an answer when there doesn't appear to be one.

C3.19 - A lot of the mistakes that I have made here are related to the style of [name of the sport] that I wanted to play. A lot of these guys weren't ready for it. But I was lucky to have spent so many years coaching B's and C's (school teams with lesser ability levels).

C4.14 - No it's just ticking the boxes (asked about formal coach education). It's the same stuff in shinier folders.

C4.15 - Yes I had to train myself (asked about watching his opponents). I think I got it from my Dad, he used to watch me play and he said I spent too much time looking around me when they boys trying to knock me over were in front of me. Anyway, the opportunity to score comes from your opponents, so it stands to reason that you watch your opponents.

C4.16 - I don't think the system teaches young coaches to think about coaching enough. The really good coaches are innovators, there is not a lot of room for trial and error at this level, so you need to develop your skills before you get here.

C4.17 - That's just how I read the game, there is so much to absorb that it has become a simple method that tells me how well we are going. It also doubles as a good way to tell the boys how they are doing. Some people talk about 'recycled ball' others use an 'arm wrestle'. These are just little things a coach does to make reading the game easier.

C4.18 - That goes back to me watching my opposition. I am pretty sure I know where I want my boys to finish every set, so I don't need to watch them. If they make a mistake, I have three assistants who will each tell me what we did wrong. I need to find the solution to a problem without any clues, so I have to watch my opposition to find the clues. I keep asking myself questions: why are they there? What's he doing there? Why are they doing that? Those sorts of things sooner or later I will pick up on a pattern or an error or some other piece of information that means something bigger.

C5.16 - Well I am heavily involved in them so I think [name of the sport] is going OK. We are moving towards more applied knowledge in the elite program, the game is constantly changing so coaching must change as well. In this role I try and develop as many coaches as I can, not just those attached to my team.

C5.17 - Well that's why I do things like this [research interviews]. They make me think about my game.

C5.18 - You never stop learning. The penny dropped for me when I was first called up to travel with the [Premier Squad]. I wasn't playing I was still a youth player, but [manager / coach's name] had me watching specific players for their involvement in certain aspects of the game. After the game I had to report to him on what I noticed. From that point on the way I watched a game changed, we used to have some great chats about [name of the interceptive game].

C5.19 - It's great, look at [highly regarded international player] they say no one can successfully defend against him because everything he does is unique to him. What makes him great wasn't learnt in the academies, it was learnt in the Favelas, that's why no one can mark him. Isn't it great? We've got to rethink how we coach and what we coach.

C6.17 – I don't know [asked about formal coach education], I guess it has got to help. But I don't think a person hanging their hat on senior tickets is very good and that is all that counts at the moment.

C6.18 - People are too scared to say 'hang on a minute' in those things too. Everyone that comes out of them (formal coaching courses) has the same stuff. Look over there [pointing at two teams warming up for a game with dynamic movement patterns] they are both doing the same thing, and you know what, I have never seen a 13 year old tear an abductor or groin ever. Most of those kids can't control a pass. They should be warming up with a ball, getting as many short and sharp touches as possible.

C6.19 – … (reading play) comes from experience. I was a defender no one taught me, but I learnt to read a game. I wasn't the faster defender so I had to have something else. Everyone says you've got to have speed. I didn't, [name of an elite forward] didn't either, but he has scored a bucket of goals. Brains can beat speed, you can make a terrible mistake if you don't realise that. Actually the only thing that beats brains is a brain with a fast pair of feet.

C6.20 – Yes, all those games that make the boys move and create space are about reading play (asked if you can develop player intelligence).

C6.21 – Kids don't think too much about things anymore. I think we thought more about the game when we were their age. I don't know how to change that but I don't think National and State directives to play a particular formation is the way to go. What happens when a young mid fielder comes up against a two five three when all they've played with or against is a four four two? Is having everyone on the same page going to give us creative players? No it's not going to help a coach either.

C6.22 – I think I mentioned before, there is no point to all these tickets. Unless they show you how to adapt the manual to suit your players. More work on styles of play wouldn't hurt either. Let these blokes figure out which one works best for their team.

5.6.1. Discussion of participant responses

The purpose to this set of research questions was to elicit an indication of whether or not features of the coaching skill set identified within this research group could be used to hasten the development of expertise in rising interceptive sport coaches. As previously raised it would have proven a futile exercise to ask this research group for their thoughts on developing such skills as 'conceptual analogies', 'configurations' and 'forward-looking decision making processes' when these very ideas and the language that frame them are collective designs. However, it was hoped that individual research participants could deliver some insight regarding how they each developed these skills and if they processes they used to acquire these skills could be replicated to others.

From the excerpts offered above it is possible to draw out two interconnected consistencies that provide some insight into how the coaching practitioners of this research group have acquired the skills and processes that help them succeed as interceptive coaching practitioners. While these consistencies do not provide a direct answer to this research question, they do provide some indication about how and why the subsequent abstract skills and processes were acquired. The first consistency responds specifically to questions regarding the merits of formal coach education courses. The second consistency to emerge from this data set is a product of the first. By recognising

the internal drive of expert coaching practitioners to succeed beyond their peers, a pattern emerges in the responses that allude to a specific type of self-determined informal education: Experiential Learning (see Beard and Wilson, 2009)

Research questions regarding the merits of formal coaching education courses have resulted in a polarisation of opinions. Research participants 1 and 5 each play a significant role in the delivery of high level coaching accreditation course in their respective fields. As such, it was expected that they each provide feedback that affirms the role of formal coach education (see C1.18 and C5.16). However research participant 1 was equally sure that advanced coaching accreditation courses do not guarantee expertise (see C1.18 and C1.19). Initially the views of this research participant appear purposeful, as if intended to support his earlier declaration of coaching as an innate art form. Yet his suggestions of a need to make, and experience, mistakes and to learn from these align with views of Abraham et al., (2006) suggestion of ten or more years' experience as a stepping-stone to expertise (see Experiential Learning in section 5.6.2).

Contrary to the opinions offered by research participants 1 and 5, the responses offered by those research participants not involved with national or state education programs were quite different. Research participants 2, 4 and 6 have each made disparaging comments regarding their own experiences with formal coach accreditation courses. Yet much of the concern expressed by these three research participants is directed at courses delivering higher accreditation. Echoing the claims of Côté et al., (1995) research participant 2 voices concerns regarding pre-requisite knowledge and whether or not there is actually any correlation between the content and assessment of these courses (2.16). Reflecting the views of Farrar et al., (2008), research participant 4 adds to the concerns of participant 2, by suggesting that the content offered in all three levels of coaching accreditation that he has undertaken have been very similar in nature (C4.14). In a similar vein to that of participant 2, research participant 6 expresses concern not with the content of these higher level courses but with what he perceives to be a predisposition for replicating existing knowledge (C6.18). This concern presented by research participant 6 clearly replicates the views of Werthner and Trudel, (2006) who suggests that formal coaching education courses position the learner as a passive consumer of knowledge. Irrespective of these concerns there was consistent support for formalised coaching accreditation courses as the most suitable medium for developing coaching practitioners outside of those involved in the delivery of these programs (see C.16, C3.17 and C6.17).

The second consistency to materialise from this section of the data set is drawn from questions concerning the formation of abstract concepts such as conceptual analogies and conceptualisation. Regardless of whether or not research participants supported formal methods of coaching education, each of the six research participants provided strong indication that informal learning has contributed markedly to their development. Among the many references to informal learning shared by these research participants, there appears to be three reoccurring type of reference. These three reoccurring types of reference found in the participant responses resonant strongly with the established concepts of 'practical experience' (Ovens and Godber, 2013), 'reflective practice' (Nash and Sproule, 2009) and 'engaging a mentor' (Cushion et al., 2003; Nash et al., 2006). Research participants 1, 2, 3 and 4 each provide strong indication that the manner in which they view and analyse interceptive action can be attributed to their vast practical experiences with interceptive games (see C1.19, C2.20, C2.21, C3.19, C4.16). Furthermore research participants 1 and 3 add additional support to this perspective by suggesting that their practical experience with lesser skilled teams has been significant in their development (see C1.22 and C3.19).

Another reoccurring informal learning style raised by a collection of research participants is 'Reflective Practice'. Donald Schon's (1983) notion of 'Reflective Practice' implies that practitioners engage in lifelong learning by analysing experiences in order to learn from them. While all research participants make reference to their capacity to reflect on interceptive action, research participants 5 and 2 most clearly verbalise their reflective practices as a step in the process of continuous learning. Irrespective of wide acclamation as an expert practitioner, research participant 5 states that he eagerly participates in all manner of interviews and other related discussion about interceptive sport on the chance that he may relearn or acquire some new knowledge that he can use to improve his own practices. Similarly research participant 2 briefly describes an ongoing process of learning by explaining why he has refined of his communication systems from hand written, individualised player reports to four organisational questions (see C2.21).

The third reoccurring style of informal learning to appear from the responses offered by the research participants was the acknowledgement of mentors. In accord with the research of Dunn (1997), Cucshion et al., (2003) and Wiman et al., (2010) five of the six research participants directly attributed much of their development to a relationship that they once shared or continue to share with a mentor (see C1.20, C2.18, C3.17, C4.15, C5.18). In most cases the mentor proposed by research participants was, at one time or another, a

coaching practitioner. However, two research participants propose significant others whose background does not rest within coaching interceptive sports. Firstly, research participant 3 attributes much of his early career development to a Catholic Brother who coached interceptive sports a hobby (see 3.15). This research participant suggests that initially he admired the manner in which this gentleman nurtured the human and sporting virtues of the lads in his care and as such replicated the coaching manner of this person. Similar to participant 3, Research participant 4 also proposes a mentor whose field of expertise is external to interceptive sport. Speaking retrospectively about the contribution of his father, participant 4 accrediting his unique approach to viewing and analysing interceptive action to discussion that he had with his father about his formative years as player (see 4.17).

5.6.2. A summary of the responses and discussion of research questions 1.4

While neither the researcher nor any of the research participants made use of the term 'informal education', there was considerable reference to the concept of informal learning throughout this final section of the data collection process. Furthermore it was not the intention of this researcher to cast informal learning as the panacea for formal coaching accreditation courses. The primary objective of this set of research questions was to obtain a better understanding of whether or not the skills and processes associated with the participants of this research could be used to develop expertise in others. On the basis of this objective it is worth discussing how the coaching practitioners of this research developed the abstract skills and processes that they use to make informed decisions rather than how they acquired individual skills and processes.

As mentioned above, there are number of consistencies and patterns that have risen from this set of research questions. However rather than dwell on individual consistencies, the answer to this fourth research question lies not in the number of informal learning styles proposed by research participants but rather how informal learning has contributed to the development of each coaching practitioner. It is evident from the anecdotes offered by the research participants, that these expert coaching practitioners have taken a proactive role in their own learning and development as coaching practitioners. As a consequence we can see in the responses above that each research participant has used a diverse range and combination of informal learning styles. However, in spite of this diversity each

research participant has used one or more learning styles that essentially revolve around experiential learning theory.

One of the most influential writers on the subject of Experiential Learning is David Kolb. Kolb (1984) suggests that experiential learning involves a cyclic process of examining and strengthening the critical linkages between theory and practice through a lived experience. Experiential Learning is predominantly concerned with the cyclic process of crafting generalisations as opposed to presupposing one form of informal learning over another. In principle Beard and Wilson (2009) would suggest that experiential learning has produced a learned behaviour (see page 155) when the reliability of an operant (action) is increased as a consequence of a temporal association of a cause and effect relationship. In the context of interceptive coaching, experiential learning requires the practitioner to apply, to experience, to interpret and to make generalisations about interceptive theory, interceptive action and interceptive actors. As such if we examine the participants responses above through a lens of Experiential Learning, instead of adopting a Positivist slant and focusing on the individual learning styles, we can begin see evidence that the research participants have independently and actively engaged in an experiential learning cycle as a means of developing their own coaching skill set. This point is most well reinforced by research participants 5 and 6 who responses suggest that coaching practitioners need to learn to ‘apply’ information and not be afraid to ‘rethink’ traditional knowledge structures (see C5.19 and C6.22).

6. Chapter Six – Towards a developmental model

While the purpose of any theory is to explain and predict certain aspects of a particular phenomenon, a model is often employed to succinctly describe what it is that a theory sets out to explain (Suarez and Cartwright, 2004). As is often the case with innovative theory much of the substance rests in the minutiae of detail. In such instances, a model is often engaged to ensure that the essence of the theory is not lost in translation. As such, due to the complex subject matter of this research an organising model was needed before a more detailed explanative model could be designed to assist in the rationalization of a theory that proposes an emergent decision making process as an indicator of expertise.

As such, to better highlight the significance of the interplay between the concepts, categories and the core categories underpinning this theory of expertise in interceptive sport coaching, an organisational model was deemed necessary. Therefore “The Stability / Instability Exchange Model” (Wharton 2011) is first offered as a means of clarifying how expert coaching practitioners organise and engage established knowledge structures to filter environmental information as a seminal step in an ‘emergent decision making process’. The “Emergent Decision Making Model” (Wharton 2012), will then subsequently be offered as a mechanism to assist in the explanation of the ‘open and complexity learning systems’ (Ovens et al., 2013) that frame this theory on identifying expertise in Interceptive Sports Coaching.

6.1. The Stability / Instability Exchange Model

The primary role of the ‘Stability / Instability Exchange Model’ is to explain how the research participants propose to have filtered and analysed environmental information. While the ‘Stability / Instability Exchange Model’ does not directly address any of the four research question, this model serves a greater purpose by proposing an underpinning philosophy in interceptive sports that enables coaching practitioners to engage dynamic patterns of information organisation. As such the ‘Stability / Instability Exchange Model’ is a representation of a philosophy that the research participants suggest they use to help filter and analyse environmental information. Consequently, the ‘Stability / Instability

Exchange Model' is offered as a mechanism to help explain how expert coaching practitioners jump between and among the organisational layers of the 'Emergent Decision Making Model'.

The 'Stability / Instability Exchange Model' arose from the responses offered by participants to the third set of research question. These questions were specifically geared to draw out any indication of how each of the research participants would generate decisions while interceptive action unfolds. As expected, each member of the research group demonstrated some difficulty when asked to verbalise the mechanics of a process that Feltovich et al., (2006) depict as complex and abstract. Ovens Hopper and Butler (2013) suggest that complex systems, like interceptive sports, are situations that involve a large number of connected and interacting agents and as such we can better understand these processes by analysing these interactions at a transphenomenal, transdisciplinary and interdiscursive level. Consequently, the aforementioned difficulty was overcome by restructuring interview questions to enable research participants to analyse and discuss the interaction of players at lower level elements of complex systems. It was the consistencies in the interaction of phenomena and understanding of disciplinary frames of the agents within these anecdotes that have resulted in the formation of this 'Stability / Instability Exchange Model'. Moreover, this model has also resulted in laying the foundations for the identification of two dynamic processes that coaching practitioners use to quickly extract meaning from interceptive action. These processes are deeply embedded in the 'Stability / Instability Exchange Model' and are paramount to understanding an emergent decision making process.

The function of the 'Stability / Instability Exchange Model' (see figure 1 on p. 161) is to present a simple figural representation of the many anecdotes used by the research participants to explain how they filter, analyse and comprehend environmental information. In more practical terms, this model is intended to demonstrate how the research participants have been able to build a cognitive bridge between theory and practice when observing interceptive action. While past research has proposed the existence of mental models (see Côté et al., 1995; see also Ericsson et al., 1996), conceptions (Abraham et al., 2006 and Farrar and Trorey, 2008) and other frameworks as a means of understanding multifarious pieces of interceptive play, there is very little information that details how these features are formed or applied to interceptive action. In fact very little is known about how coaching practitioners view and make sense of live interceptive action. To better

understand how coaches make sense of interceptive action, I have engaged Mason's (2008) interpretation of Complexity Theory to gain insight into how coaching practitioners manage to identify and utilise the most valuable information streams as the seminal step towards a decision making process. Consequently by recognising that interceptive action is neither regular nor random, but a complex relationship between elements that gives rise to emergent qualities, one can begin to appreciate the dialectic exchange notion that underpins the design of the 'Stability / Instability Exchange Model'.

6.1.1. Underpinning features of the 'Stability / Instability Exchange Model'

A reciprocal appreciation of interceptive action

The purpose of the 'Stability / Instability Exchange Model' is to illustrate how the research participants process the movements of players involved in interceptive play and to demonstrate how they use this information as a filtering mechanism for identifying and prioritising certain elements of interceptive action. In a similar manner to Complexity Theory which analyses the interactions between elements within an open system (Ovens et al., 2013), the 'Stability / Instability Exchange Model' describes how the research participants perceive action as a reciprocal interaction of opposing and affiliated forces. In the course of using anecdotes to describe how they generate decisions, it became evident that each of the research participants maintain four similar assumptions that underpin the seminal stages of a decision making process in their respective interceptive sports. These assumptions emerge from a preconceived belief that interceptive action is highly structured; the use of conceptions and conceptualisations (see page 131) as a tool for blending isolated knowledge structures; an appreciation of conflicting process goals of opposing players; and the use of conceptual analogies as a filter of environmental information. These four assumptions combine to form the 'Stability / Instability Exchange Model'.

The first assumption that can be consistently drawn from the anecdotes offered by research participants is based on their belief that all opposing teams play according to a highly structured pattern. Research participant 3 most clearly reinforces this point by suggesting that he is often familiar with the attacking intention and defensive weaknesses of his opponents (see C3.11). However, the consequence of opposing a highly structured

rival is a perceived need for an equally structured counter plan. Research participant 5 most clearly reinforces this point by suggesting that he would prepare his teams attacking and defensive options based on his understanding of an opponent (see C5.15).

While this analysis of past interceptive action may appear excessive, the effort serves a far greater purpose. According to Ovens et al., (2013b), when autonomous agents of a complex system familiarise themselves with patterns of behaviour within that system – the agent can become more attracted to the emergent information that pre-empt these patterns of behaviour. Consequently the research of Ovens and colleagues (2013b) concurs with the assertions made by research participants and supports this first assumption that familiarising oneself with the structural and organisational nuances of an opposing team enables an agent to swiftly recognise attacking and defensive anomalies in either team's structure before a cause and effect action impacts on the game.

This assumption of structure and involuntary anomalies is further reinforced by the research participants' claim that scoring opportunities in elite contests are crafted rather than freely received. Research participants 1, 4, 5 and 6 each suggest that due to the highly structured defensive patterns of their opponents they are required to manipulate a defence to create scoring opportunities. The intimation made by these research participants is that they capitalise on their own understanding of an opponent by designing a game plan that will target, or manipulate, perceived points of individual weakness to create instability in an opponent's larger defensive formations. These research participants suggest that they can swiftly identify indicators of imminent instability in an opponent's defensive formation by recognising what is, and what is not, habitual behaviour. This assumption and the notion of manipulating an opponent's structure to gain an ascendency highlight the value of an agent remaining open to what Davids, Button and Bennett (2008) refer to as 'attractor wells of emergent information'. The impact of this first assumption on the 'Stability / Instability Exchange Model' can be further reinforced by the similarities that can be draw between this assumption and complexity theory's notion of supervenience and the role it plays in complex adaptive systems. Mennin (2007) explains the notion of supervenience as a representational understanding of how low level constituent parts (declarative knowledge about an opponent) within a larger system (the 'Stability / Instability Exchange Model') can influence higher level constituent parts (emergent actions). In the context in interceptive sports, this first assumption enables coaching practitioners to

understand higher level or more complex interceptive action as the product of the interaction between lower level parts.

The second assumption that can be drawn from the narratives offered by the research participants' is concerned with their seemingly innate use of conceptualisations. Building onwards from Schempp, McCullick and Mason (2006) description of expertise as an adroit ability to change the course of action, this second assumption suggests that the research participants' have an acquired ability as opposed to an innate ability, to quickly recognize and analyse only the most pertinent environmental information streams. It is this ability to pre-empt and select specific knowledge structures and analyse these in light of the environmental information that correlates only to these knowledge structures that enables a coaching practitioner to have what appears to the lay person as an innate influence on interceptive action. Initially the researcher expected that by asking the research participants to reflect on personal anecdotes for explanatory evidence of this process, that research participants would recall situations that demonstrate how they knew where and what to search for when viewing interceptive action. However despite this, there was no specific explanation offered by research participants that explains how practitioners accumulate, store and more importantly select from the myriad of knowledge structures[11] other than for what Wiman, Salmoni and Hall (2010) would describe as a learned ability (see page 150).

In spite of this uncertainty regarding the coupling of action with specific knowledge structures (the transformation of a conception to a conceptualisation), the matter was made more complex by retorts of irreverence concerning the use of identification and selection of specific knowledge structures. Research participants 1, 2, 4, and 6 each suggested that there are functional limitations to the fixed knowledge structures acquired in the entry level formal coaching education courses (see C1.20, C2.5, C2.16, C4.15 and C4.16 and C6.17). The insinuations made by these research participants is that high performance coaches practice at a level that exceeds the content offered in formal coaching education courses. However, while it has already been established by Williams et al., (2008) among others, that much of a coaching practitioners development occurs externally to formal learning environments, the comments offered above suggest that the

[11] Conceptualisations are formed when two or more knowledge structures are combined to generate a new knowledge structure or a predetermined outcome.

answers to uncovering how coaching practitioners are able to garnish an understanding of interceptive action lie within the research of Boud and Middleton (2003) and Reade, Rodgers and Spriggs (2008). Boud and colleagues suggest that high performing practitioners speculate on the expected responses of players when exposed to specific game related scenarios (use conceptualisations). As such the literature, in accord with the responses offered above, would suggest that astute interceptive sports coaches may speculate on the outcomes of expected behaviours and use these calculations to develop and apply innovative practice.

In harmony with the conclusions of Boud and colleagues and Turner, Nelson and Potrac (2012), research participants 1, 2, 5 and 6 each suggest that due to the highly contested nature of their interceptive sports (first assumption) they have learnt to creatively combine and adapt two or more structures of traditional knowledge (conceptions) (see C2.23, C5.19 and C6.22). These coaching practitioners justify this creative use of information (conceptions) as a necessary means of searching for environmental information, for fashioning opportunities to gain an ascendency. The comments by these four research participants also reflect the views of Werthner and Trudel (2006) who suggest that highly attuned practitioners evolve beyond the linear use of knowledge structures that support a beginning practitioner. While research participant 1 openly discusses the notion of 'creating half holes', it is research participant 2 who most clearly reinforces this idea of building onwards from the linear frameworks disseminated in formal coaching education courses. Research participant 2 declares that he learnt most about the intricacies and principles of attacking strategy by reflecting about ways to defend against proficient attacking teams (see C2.16 and C2.23). It is the belief of this coaching practitioner that he has learnt most about the application of attacking strategy by recognising defensive conventions and more importantly evidence of deviation (see also C5.15 and C6.20).

This learned use of conceptualisations as a means of creating structural deviation in an opponent is well supported by other research participants (see C1.14, C2.15, C5.13). Research participants 1 and 5 for example each deliver anecdotes that support the idea of initiating action (a conception) with the intent of manipulating the behaviour of their opponents (seeking environmental information to either validate or deny a conceptualisation) (see C1.17, C5.14, and C5.18). The implications drawn from these anecdotes add considerably towards explaining how coaching practitioners' couple what they see with what they know. Rather than implementing random attacking strategy, it is

the suggestion of these coaching practitioners that they will apply a premeditated strategy that is designed to create deviation within their opponent's game plan. Interestingly, these premeditated strategies are calculated according to the coaching practitioners' assessment of his opponents, his understanding of the capacity of his own team and a deep understanding of game strategy. As a consequence of this cognitive preparation, coaching practitioners are able to focus their attention on the predetermined sites where imminent signs of deviation are likely to occur.

This second assumption drawn from the narratives offered by the research participants provides valuable insight regarding the confirmation and explanation of a process that is comparable to the previously discussed notions of 'mental models' (see Côté et al., 1995 and Ericsson et al., 1996), 'conceptions' (see Abraham et al., 2006 and Farrar and Trorey, 2008) and 'integrated knowledge' (Côté et al., 2009). In a similar fashion to that of Côté and Abraham and their respective colleagues, research participants 1 and 5 have implied that they avoid a linear model of analysis by analysing interceptive action according to a series of predetermined conceptualisations. While neither research participant actually used the term conceptualisations, they have each described an analytical process that evaluates interceptive action through a series of preconceived inferences. Each of these preconceived inferences is the product of a cognitive calculation or blending of two or more opposing, affiliated or integrated knowledge structures (see Côté et al., 2009).

Research participants 1 and 5 each suggest that they fuse a number of traditionally isolated knowledge structures to calculate or infer desirable outcomes. For example research participant 1 suggests that he analyse interceptive action according to his players' ability to successfully complete a set of goals (see C1.14) or jobs (see C1.16). Likewise, research participant 5 suggests that he analyse interceptive action according to a set of predetermined process goals (see C5.14) and personal assignments (see C 5.16). This use of conceptualisations enables the coaching practitioner to directly link interceptive action to predetermined knowledge structures that explain what individual players are doing or need to improve on to achieve specific outcomes.

The third assumption that can be extracted from the anecdotes offered by the research participants' is an extension of the first and is ground in a reciprocal appreciation of interceptive action. This third assumption is drawn from a belief that interceptive action can be perceived as a sequence of objectives that are won and lost according to a cause and

effect exchange of opposing forces. Research participants 1, 2, 4, 5 and 6 each contend that due to the highly structured nature of the competitions in which they each practice, interceptive action is effectively a succession of smaller contests and that each contest is an exchange of opposing forces applied by players with reciprocal goals (see C1.17, C2.15, C4.12, C5.19 and C6.10). Consequently, research participants suggest that they will evoke a particular attacking play to produce a desired defensive behaviour from their opponents.

This notion of reading interceptive action, as a dynamic exchange of opposing forces and reciprocal goals can be further explained by research participants 1, 2 and 4 who each describe the traditional elements of interceptive action[12] as equal opportunities to gain a positional and or physical ascendency. These aforementioned research participants each suggest that they aim to challenge the stability of their opponent's structures with a more stable attacking or defensive game plan. Research participant 1 adds this point by suggesting that the trick for his players is to accurately transfer from a performance goal such as acquiring field position, to a process goal of winning body position on the ground (see C1.14, C1. 17). The suggestion made by this coaching practitioner is that while his players have individual performance goals, these are overridden by more meaningful process goals that are sequential elements in a greater plan designed to create instability in opposing teams formations (see C4.12 and C6.10).

The advantage afforded a coaching practitioner who can appreciate this notion of reciprocal goals is purely organisational. In a similar vein to that of Ovens et al., (2013) assessment of understanding complex systems, a coaching practitioner that interprets interceptive action as a series of reciprocal goals, does not perceive interceptive action as predictable or regular, but nor do they see it as random or chaotic. By understanding the reciprocal goals of opposing players and acknowledging that one set of goals is designed to displace an opposing set of goals, a coaching practitioner can focus their attention to specific elements of interceptive action. This skill enables the coaching practitioner to simultaneously analyse the performance of groups of opposing players as opposed to calculating the performance of individual players and determining the reasons as to why they are or are not achieving individual performance goals. The ability to interpret interceptive action in this manner enables the coaching practitioner to identify, isolate and

[12] The two traditional elements of interceptive sport are attack and defence

analyse only the features of interceptive action that are most aligned with the process orientated goals of their personal conceptual analogies (the fourth assumption).

The final assumption that can consistently be drawn from the participants' anecdotes is concerned with the use of analogies as an overarching lens for analysing interceptive action. Based on the aforementioned postulations that elite interceptive action is highly structured and that counter plans are designed to test the resolve of an opponent's game plan, research participants suggest that they engage a conceptual analogy to instantaneously determine the state of interceptive play. These analogies adopt one conceptual underpinning that best describes the processes that define their long term perception of their interceptive game. For example research participant 1 spoke of viewing the game through a 'risk (and reward)' analogy, while other research participant use analogies that described their sport as an equation between 'position and possession', a balance between 'gaining and relinquishing of field position', or even as an 'energy' and 'time in possession' equilibrium.

Initially it would have been easy to discard each of these analogies as rhetoric or even sport specific literacies. However each research participant indicated that in moments of unstable play they defaulted back to their unique analogy as a means of better understanding the state of play and to search for an opportunity to act. Research participant 4 reinforces this point by submitting that he uses his analogy of 'gaining and relinquishing field position' as the basis for determining the state of play during a tense period in a game (see C4.17). This coaching practitioner suggests that in periods of tightly contested interceptive action he will resort back to his field position analogy to determine if his players are fulfilling their roles, if his opponents are reacting as expected and or to determine if his game plan was having the desired effect.

The most significant feature of these analogies is the encompassing concept under which they each operate. For example, research participant 6 consistently refers to the analogy of 'using space'. This coaching practitioner suggests that when his team is in attack, he would expect that each of his players are moving into and out of predetermined pockets of space, to either create space for a team mate or to capitalise on space that has been created. Alternatively in defence, he expects that each of his players would be holding or moving towards pockets of space, to close down potential channels of ball movement. While the concept underpinning the 'using space' analogy appears overtly simple, this

coaching practitioner suggests that such analogies carry significant conceptual connation for all players. As such the 'using space' conceptual analogy holds specific meanings to individual players and certain positions on the field. Consequently it is the suggestion of this research participant (and others in the research group) that a conceptual analogy enables the coaching practitioner to view and assess a broad field of interceptive information through a single lens of analysis.

6.1.2. A Description of the 'Stability / Instability Exchange Model'

The flow chart below (see Figure 1) is offered as a figural representation of a narrative that has been created from the anecdotes of six research participants. This collective narrative, labelled the 'Stability / Instability Exchange Model' is intended to describe a theory that proposes that expert coaching practitioners use conceptual analogies as a filtering mechanism for understanding interceptive action and subsequently identifying the most pertinent environmental information streams.

Figure 1.

The ‘Stability / Instability Exchange Model’, is a simple figural representation of how the research participants perceive interceptive action. This flow chart suggests that when in attack, a coaching practitioner intends to deliver a stable attacking plan that aims to create instability in their opponents’ defensive plan. Alternatively, if defending a coaching practitioner will view and analyse his team’s defensive effort according to whether or not they are presenting a stable defensive plan that creates instability in their opponents attacking game plan. Consequently, it is suggested that coaching practitioners will filter environmental information according to whether or not he can see indication of desired instability in his opponent’s attack and or defence.

The purpose of the ‘Stability / Instability Exchange Model’ is to assist in the explanation of a more complicated theory, one that is designed to explain how expert interceptive sports coaches engage in a decision making process. However to understand how a coaching practitioner generates decisions we first need to know how they identify the most pertinent information that fuels a decision making process. This ‘Stability / Instability Exchange model’ explains how expert coaching practitioners isolate and identify the content rich information streams made available throughout interceptive games. However to truly comprehend this model one relies inherently on the four previously mentioned assumptions. Nevertheless rather than revisit each of these assumptions I will describe the ‘Stability / Instability Exchange Model’ in accordance with one of the conceptual analogies offered by a research participant.

Research Participant 4 has created a ‘Position from Possession’ conceptual analogy to better view and analyse interceptive action. Consequently this coaching practitioner perceives every piece of interceptive action as a battle for field position – regardless of whether or not his team is in possession of the ball. If we start at the top of figure 1 and assume that this coaching practitioner is in possession of the ball we can see by moving down the right hand side of the flow chart that a coaching practitioner’s fundamental outcome is for his team to present or impose a stable attacking foray that is specifically designed to create instability in his opponents defensive formations. To better understanding what is meant by a stable attacking foray that creates instability in their opponents defence we need to revisit the first three previously mentioned assumptions.

Firstly, coaching practitioners familiarise themselves with the consistent defensive idiosyncrasies of their opponents (assumption 1). Secondly, once these consistencies have been calculated and identified as either strengths or possible weaknesses, the

coaching practitioner will design a simple attacking plan that is devised to challenge these defensive weaknesses (assumption 2). Each attacking game plan will involve individualised goals and team based performance objectives. Such objectives might involve such tasks as targeting a specific defender, or isolating one side of the playing field or even moving a defensive player out of formation. The attacking options available to one coaching practitioner to destabilise an opposing defensive unit are endless, but each is unique to the defensive capabilities of each team. Finally, with a stable attacking plan in motion, a coaching practitioner is free to analyse each subsequent piece of play as a reciprocal exchange of objectives between opposing players (assumption 3).

This notion of a reciprocal exchange of forces (or goals and objectives) provides the coaching practitioner with the material to fuel an attack orientated decision making process. The coaching practitioner can use the individualised goals and team based performance objectives that make up an attacking game plan as a schematic framework for analysing the performance of his players. This schema enables the coaching practitioner to scan the immediate confrontation of players around the ball to determine if individuals are achieving personal goals while simultaneously scanning the opposing team regroup into their defensive formations. This scanning of the defensive formations is done with the acknowledgement that some defensive players are preoccupied in the confrontation around the ball. With certain defensive players are committed to the confrontation around the ball, the coaching practitioner is able to determine if the wider performance objectives are having the desired effect by measuring the responses of the defensive team.

Alternatively, if the same coaching practitioner were without possession of the ball (at the bottom of Figure 1), he would expect his charges to implement a preconceived stable defensive pattern (assumption 1) that is designed to create instability in their opponents attacking game plan (assumption 3). This stable defensive pattern is designed to achieve two possible outcomes – each with individual goals and team orientated performance objectives. The first desirable outcome is to present and maintain a stable defensive structure that does not wilt under the pressure of an opposition's proactive attacking plan. An indication of a stable defensive pattern is one that maintains their defensive formations and inhibits the attacking team from gaining forward motion up the field when in attack. The second defensive objective is to constrain the intentions of the attacking team (assumption 2) to such a point that their defence creates instability in the attacking

intentions of their opponents. An indication of this would be quick turnovers of possession in the wrong areas of the field.

Again, it is the suggestion of the research group that these goals and performance objectives provide the coaching practitioner with a schematic framework for identifying the information used to generate defensive orientated decisions. Secure in their own understanding of the intended defensive movements and formations of his players, coaching practitioners can switch their focus of attention between two features of interceptive action searching for signs of deviation and meaningful configurations of attacking players. Signs of deviation will be presented by his own players failing to adhere to individual goals such as (but not limited to) marking opposing players, applying pressure to the ball distributor and ball receiver or failings by an individual player to adhere to the roles and expectations of a wider defensive pattern. However, after scanning the immediate action around the ball, a coaching practitioner will shift his focus of attention to search the attacking team for any predetermined shifting of players towards recognisable configurations that can be associated with an attacking advance.

An interesting feature of the ‘Stability / Instability Exchange Model’ is that while the narrative above describes both the left and right hemispheres of the model independently, the reality of interceptive sport and the intentions of this model are quite the opposite. Just as interceptive action is the simultaneous interplay of cause and effect forces, each half of this model is to be interpreted as a simultaneous interplay of attacking (right side) and defensive (left side) hemispheres. The purpose of each hemisphere is to implement an action, which is intended to alter the actions of their opponents. Each member of the research group clearly describes coaching practice as reciprocal exchange of opposing players and coaches. While one coach and team of players are initiating a stable yet proactive attacking game plan, trying to manipulate the movements of defenders to create opportunities to attack. There is another coach and team of players who are equally as diligent in their attempts to present a stable defensive unit that not only foils the attacking probes of their opponents, but also is urgently trying to destabilise their opponents to try and win back possession of the ball.

6.2. The Emergent Decision Making Model

An Introduction: Three Underlying Assumptions

Before proposing the 'Emergent Decision Making Model' (see figure 2) as a tangible mechanism for determining expertise and perhaps as an instrument for quantifying the effectiveness of interceptive sports coaches that practice at the developmental and performance end of Lyle's (2002) model of coaching boundary markers. It is first important to ensure that we are familiar with the three underlying formations of Ecological Psychology that will circumscribe this conceptual model.

Firstly, and most importantly, it is essential that research in this field of study ceases with this notion of interpreting interceptive coaching as a linear system of cognitive practice. The Emergent Decision Making Model is dependent upon the understanding that interceptive sports' coaching, at any level, occurs in an open and complex system that is made up of many interacting features (Davis and Sumara, 2003; Clarke and Crossland, 1985). Such features include dynamic streams of environmental information and evolving knowledge domains – each of which is capable of affecting the value and contribution of other domains. While the information streams are temporary and short lived, the knowledge domains are more stable and serve the secondary purpose of providing the Emergent Decision Making Model with a framework for functional constancy. As such, the four knowledge domains that sustain this complex system provide a location for the traditional or linear comprehension of information as well as offering a base for the formation of multifarious conceptualisations.

The second underlying assumption from Ecological Psychology that assists in the development of an 'Emergent Decision Making Model' is the acceptance that some linear processing of information may occur. Even in open and complex systems there is some degree of organisational stability that leads to a decision making process – albeit a more demanding process (Araujo et al., 2006). In the open and complex systems that frame the practice of interceptive sports coaching, such elements of organisational stability can be likened to the linear pathways used by cognitive perspectives to describe the calculation and coordination of relevant information. In Ecological Psychology these pathways are referred to as Stable Patterns of Organisation' (Davids, Button, and Bennett 2008). In the

Emergent Decision Making Model these stable patterns of organisation are signified by the connections between the four domains of knowledge and are representative of the traditional cognitive processes that can occur. In figure 2, the bold connecting lines represent the linear interplay that can occur between the four domains of knowledge prior to generating a decision.

In open and complex systems, and unlike their linear counterparts, there is no predisposition to engage these prevailing pathways of organisational stability. According to Ecological Psychologists, these linear pathways are not always suited to tasks that involve acute and dynamic sources of information (Renshaw et al., 2010). The 'Emergent Decision Making Model' is specifically designed to describe an action (decision making) that deals exclusively with acute and dynamic sources of information (interceptive action) and as such perceives 'organisational stability' as a working constraint. While the 'Emergent Decision Making Model' acknowledges the contribution of pathways of organisational stability, it equally accepts that these pathways can reduce a coaching practitioner's ability to promptly couple short lived environmental information streams with two or more isolated domains of knowledge.

Borrowing from the ecological perspective, the 'Emergent Decision Making Model' proposes that whenever possible coaching practitioners have overcome the constraint of organisational stability by creating more dynamic patterns of organisation. In the same manner that the aforementioned stable patterns of organisation represent the conscious interplay between domains of knowledge and environmental information. These dynamic patterns of organisation otherwise known as 'Attractors' (see Davids, Button, and Bennett 2008, p. 32) are indicative of the subliminal interplay that exists between all domains of knowledge and the environment. It is the suggestion of this research that expert coaching practitioners have negated the use of stable patterns of organisation by designing and applying premeditated conceptualisations. Each conceptualisation is a representation of two or more domains of knowledge and is open to impending streams of information. These dynamic patterns of organisation are identified in Figure 2 by the fine lines connecting the various domains.

The third and final assumption that underpins this model is the notion of self-organisation. Reinforcing the idea of reciprocal exchange of information, Newell and Vaillancourt, (2001) suggest that open and complex systems have the potential to exchange information with

the immediate environment. This cause and effect exchange of information affords the open and complex system the ability to either engage a ‘stable pattern of organisation’ or access more dynamic patterns of organisation. This ability to filter external cues such as environmental or task related information provides the open and complex system the opportunity to self-organise a response to meet the dynamic conditions at hand. Self-organisation is the prevailing process that can assist the coaching practitioner to rapidly engage or short circuit the decision making process. However, to suggest that the process of self-organisation is a completely unbridled process would be naïve. The very strength of the self-organising process is that attractors need not engage every information stream. It is clearly acceptable for open and complex systems to lean on individual or blended anchors of organisation such as specific domains of knowledge.

This notion of stable and dynamic patterns of organisation coexisting within an open complex system serves a dual purpose. Firstly, it offers an explanation that ensures that this model is functionally suited to the ever-altering demands of coaching practice. However, this ever so slight recognition of linear systems also provides the impetus to utilise some concepts from the cognitive paradigm to better explain the blending of domain specific perspectives. However, to fully comprehend the ecological formations of open and complex systems, stable and dynamic patterns of organisation and self-organisation by stable and dynamic attractors, a detail account of the models’ framework and individual domains is be required.

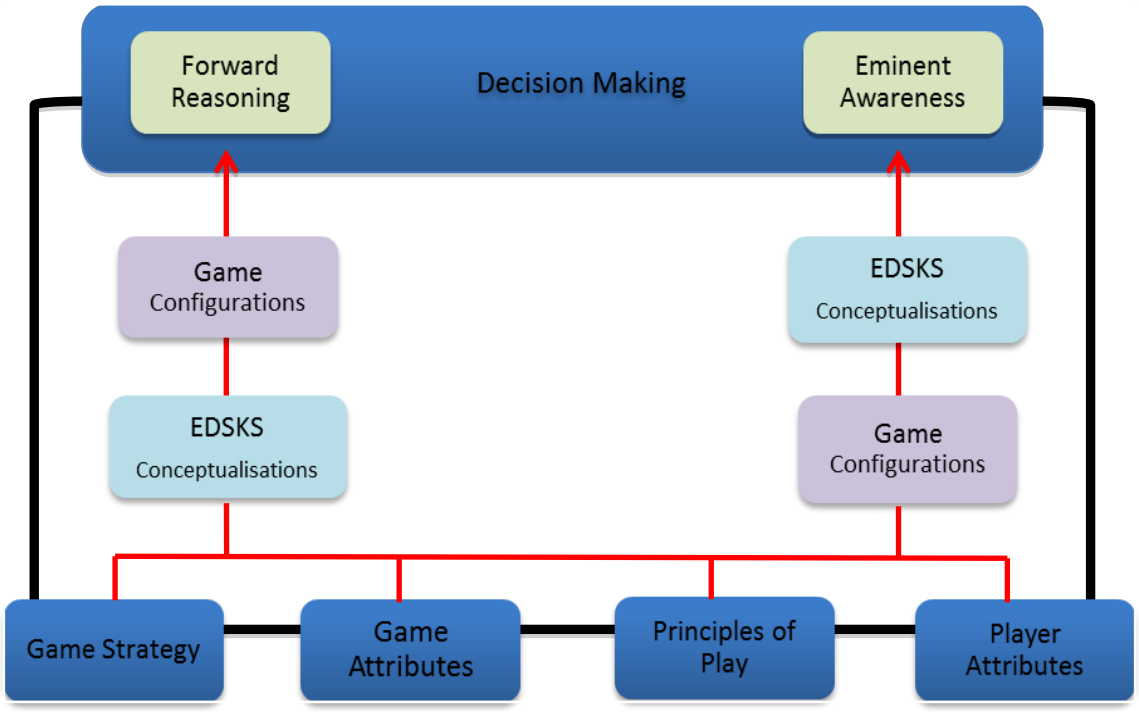

Figure 2
The 'Emergent Decision Making Model' is a simple figural representation of two processes (Forward Reasoning and Imminent Awareness) and two abstract concepts (EDSKS and Game Configurations) that expert coaching practitioners use to generate decisions. The four domains of specific knowledge that are located on the first tier of this model are representative of the knowledge structures a that are most usually associated with interceptive sports studied in this research. These domains are labelled 'Game Strategy', 'Game Attributes', 'Player Attributes' and 'Principles of Play'. The bold black lines that connect these four domains to the larger 'Decision Making' box is representative of the stable patters of information organisation that are typical of a cognitive perspective of decision making. The four internal boxes (2 Game Configuration and 2 EDSKS boxes) are representative of the abstract concepts that coaching practitioners use to activate dynamic patterns of information organization (from the four boxes on the first tier of this illustration) and represent the dynamic patterns of organisation espoused by the 'Emergent Decision Making Model'. The fine red connecting lines identifies these dynamic patterns of information organisation.

6.2.1. Stable Patterns within the 'Emergent Decision Making Model'

The Four Domains of Knowledge

For organisational reasons, this model was designed around a hierarchical arrangement that positions the four traditional domains of knowledge and any low level interaction that accompanies these domains running horizontally along the base of figure 2. All higher level interactions that are representative of dynamically patterns of information organisation are running vertically from the base to the apex. Positioning the four

traditional domains of knowledge at the base of a hierarchical arrangement serves two purposes. Firstly, it represents the linear interaction that can occur between any number of the four domains as key elements in stable patterns of information organisation that may contribute towards the generation of a decision making process. Secondly it demonstrates how each domain shares a reciprocal relationship with both attacking and defensive facets of interceptive action and that all higher level interactions originate from these four domains of knowledge. It is this reciprocal relationship between domains of knowledge, between domains of knowledge an interceptive action and between the two facets of interceptive action that separate this model from other attempts limited to cognitive perspectives of explanation. The four key domains of specific knowledge that drive this Emergent Decision Making Model are: Game Strategy, Game Constraints, Player Attributes and Principles of Play

The Game Strategy domain requires a practitioner to have a complete understanding of generic and innovative representations of both attacking and defending styles of play. Encompassed in this realm of domain specific knowledge is the expectation that an expert coaching practitioner would be familiar with the prerequisite concepts for enacting and counteracting various styles of play. Gobet and Simon (1996) have previously proposed a similar notion of experts possessing a deep understanding of the prerequisite concepts that underpin game strategy by suggesting that experts rely on 'recognition mechanisms'. Similarly, borrowing from the work of Entwisle and Entwisle (2003), Abraham et al., (2006) suggest that experts make use of 'knowledge objects' as a means of integrating a breadth and depth of knowledge that covers multiple related concepts and conceptions. Moreover Tuffiash, Roring and Ericsson (2007) effectively describe these 'recognition mechanisms' and 'knowledge objects' as chunks of encoded information that influence and activate a practitioner's long term working memory. Once a system of play has been recognised and catalogued in the long term working memory there is no need to re-evaluate the underlying concepts before allowing an action (decision) to emerge. As such these recognition mechanisms provide the coaching practitioner with a rapid index to coaching knowledge structures and tools of analysis specific to the activity. However, beyond this notion of working memories a key feature of this domain is an ability to understand, manipulate and even create innovative game strategy.

The next domain is labelled 'Game Attributes' and is primarily concerned with the understanding and application of the inflexible features that are distinctive to each

interceptive game. Borrowing from the work of Davids, Button, and Bennett (2008; see also Newell, 1986), the domain of 'Game Attributes' can be catalogued into three broad categories of limitation. These three categories include task limitations: such as rules, roles of various positions and the reciprocal objectives of an opponent, player limitations: such as the physiological capacity of individuals to meet and achieve positional demands, and environmental limitations: such as playing conditions and spaces. While there is a wide body of literature in the form of coaching and training manuals that has examined and deconstructed the distinctive features of many interceptive sports, much of this has been written without consideration of interceptive sports as a multilayered and contested construct.

The third domain on the lower rung of this hierarchical arrangement is 'Player Attributes'. This domain requires the coaching practitioner to be familiar with the physical, psychological, social and emotional qualities of each player within the team. In a similar fashion to Abraham et al., (2010) recognition of the 'ologies' in their Coaching Schematic, this domain is primarily concerned with a coaching practitioners understanding of the psychological, sociological and physiological limits of players. This domain requires the coaching practitioner to acquire as much of the same knowledge about as many opposing players as possible. At a rudimentary level, this field of knowledge is developed through experience and appears strictly declarative. However 'in the heat of battle', the effective engagement of this knowledge structure is inherently dependent upon the coaching practitioner's ability to look beyond live interceptive action. By understanding the attributes of individual players an expert coaching practitioner can procedurally apply this declarative knowledge to forewarn of distinguished actions occurring in periods of stability.

The final domain in this section of the arrangement is 'Principles of Play'. While similar to the first component discussed, this field of specific knowledge encompasses a microanalysis of the entire individual playing roles that constitute a greater stratagem. This domain is representative of the abstract principles that underpin the stability / instability exchange that occurs between attacking and defensive forces during interceptive play. A coaching practitioner must be cognisant of the specific roles individual players conduct 'on' and 'off the ball' in each individual set play or piece of interceptive play. Unlike the other domains on this level of the hierarchical arrangement, this domain is comprised primarily of procedural knowledge structures. This domain requires coaching practitioners to have a preconceived outcome regarding certain aspects of interceptive play. For example, a

coaching practitioner should associate certain outcomes with the roles various players execute as means of creating space, time, and deception and or establishing a numerical advantage. Unlike other domains of knowledge, the 'Principles of Play' domain is inherently focused on serial events and procedural outcomes and as such is open to variables of instability. It is this deep-seeded understanding of the variability of interacting principles of interceptive action that Phillips, Davids, Renshaw and Porter (2012) suggest is at the heart of innovative and creative coaching that leads towards expertise.

An interesting feature shared by all four domains is that they each are comprised of information that is empirically established and habitually maintained. In fact the only potential for variation to the content of each domain would stem from broader infrastructural changes to interceptive games or variability in the way that games are perceived and played. As a consequence of this mostly static body of information and its generic nature, it is fair to accept that expertise is a quality that must be greater than the sum of acquired knowledge. This statement is reinforced by the views of Chia (2002) and later Abraham et al., (2006) who suggest that expertise needs to be measured by how a coaching practitioner uses information rather than the volume of information they possess.

These views offered by Abraham and Chia and their respective colleagues are only a small reflection of a wider body of work that questions the idea that expertise is attained through an obligatory period of deliberate practice (see Ericsson and Smith, 1991 and Ericsson and Lehmann, 1996). While these aforesaid studies of expertise foster concerns regarding the quantity of knowledge, more recent research has focused on the disparity in the quality of actions (decisions) generated by expert and less expert coaching practitioners. However even in light of these concerns supporters of the cognitive perspective steadfastly maintained their views that decisions are the products of an Information Processing Model. Debanne and Fontayne (2009) reaffirm this cognitive approach by suggesting that experts have the capacity to recycle the principle features of domains of knowledge and as such a more efficient and effective practitioners.

This notion of recycling the conclusions of reoccurring actions is a tangible proposition, albeit only for the explanation of how experiential knowledge can speed up the cognitive calculations associated with stable patterns of information organisation. Nevertheless, this cognitive approach cannot account for the origin and speed of decisions that address creative play, or completely explain the disparity in time taken by expert and less expert

coaching practitioners to generate effective decisions. However, Mallett and Trudel (2009) offer some direction into this matter by suggesting that expert coaching practitioners have the capacity to access and apply a more diverse range of knowledge structures.

Acknowledging and assenting to the recommendations offered by Mallett et al., (2009) the notion of stable patterns of organisation will always exist in an auxiliary capacity within the Emergent Decision Making Model. The contribution of this auxiliary role is made most relevant when we consider the options available to a coaching practitioner who is required to generate a decision in fields of novel or foreign play (see C3.10). In situations where by a coaching practitioner is operating in unfamiliar environments he or she will be required to retreat back to stable patterns of information organisation as a means of better understanding what is occurring on the field of play (see C4.18). However beyond this auxiliary role of the stable patterns of organisation the Emergent Decision Making Model maintains that expert coaching practitioners have developed the capacity to circumvent such time consuming processes by engaging more dynamic patterns of information organisation. This notion of expert practitioners engaging dynamic patterns of information organisation is the essence of an emerging decision making model and primarily occupies the second tier of the hierarchical arrangement presented in figure 2.

6.2.2. The Dynamic Patterns of the 'Emergent Decision Making Model'

Two Abstract Concepts and Two Unique Processes of Analysis

Two Abstract Concepts

The motivation for the use of dynamic patterns of information organisation has been built on the identification of two abstract concepts and two unique processes of analysis. While neither of the two abstract concepts is completely innovative, their application to interceptive sport and the sequence in which each is used to generate decisions is unique to the 'Emergent Decision Making Model'.

The first of these two abstract concepts is labelled 'Extended Domain-Specific Knowledge Structures' (see page 131). The purpose of this concept is to explain how expert coaching practitioners organise knowledge in such a manner that they can avoid the expansive process associated with Cognitive Psychology's interpretation of a decision making

process. This Cognitive perspective has inhibited research of this nature in the past by recognising only two forms of knowledge (Banks and Millward, 2007) and with a predisposition for using an Information Processing Model as a means of explaining how decisions are generated (Saury and Durand, 1998; Lyle, 2002; and Nash and Collins, 2006)[13]. Still notwithstanding of this misdirection, the earlier research of Côté et al., (1995) and later Abraham et al., (2006) and Farrar and Trorey, (2008) had proposed, but not fully defined, the notion of 'mental models' and 'conceptions' among other mechanisms as a means of explaining how expert coaching practitioners generate actions more effectively than their lesser skilled peers. The 'Extended Domain-Specific Knowledge Structure' (EDSKS) is offered as a more detailed depiction of how expert practitioners use knowledge structures to aid in the decision making process.

The central feature of this Extended Domain-Specific Knowledge Structure is the formation and application of internal and external conceptualisations (the product of blending two or more declarative and or procedural knowledge structures). The notion of conceptualisations has been lightly touched upon earlier in the 'Stability / Instability Exchange Model' (see also page 131) and is essentially a mechanism for blending independent elements of opposing or related knowledge structures. In its broadest sense, a conceptualisation can produce an anticipated outcome from opposing features of any two, or more, domains of knowledge. Consequently, an Internal Conceptualisation produces an anticipated outcome that has been drawn from interrelated features from any two or more domains of knowledge that do not involve an opponent. For example, an outcome that is drawn from the interplay of a feature from the Game Attributes domain such as positional responsibility and a feature from the Player Attributes domain such as speed does not involve an opponent and as such is classified as an Internal Conceptualisation.

In a similar vein, an External Conceptualisation is by definition the same as an Internal Conceptualisation except for the fact that it will produce an expected outcome that is drawn from one or more domains of knowledge that involves the interactions of an opponent. For example, an outcome that is drawn from an exchange between features

[13] These are examples of earlier research that have been unable to describe the cognitive processes used to generate decisions in any less ambiguous terms then 'implicit knowledge' (Saury et al., 1998), intuitive decision-making (Lyle, 2002) or 'tacit knowledge' (Nash et al., 2006).

from the Principles of Play domain such as creating a quick second phase of play is dependent upon an opposing feature from the Player Attributes domain such as muscular endurance. Consequently this involvement of a third party constitutes this exchange of information registering as an External Conceptualisation.

Originally this notion of conceptualisations was only intended to provide some insight on the matter of how expert coaching practitioners organise and access the knowledge structures that help generate decisions. Nevertheless beyond this initial goal a more interesting extrapolation can be drawn from a degree of cohesion between the defining feature that separates the two aforementioned conceptualisations and the literature surrounding nonlinear perspectives on expertise. The feature that separates internal and external conceptualisations is the involvement of an opponent or an opposing team. Internal conceptualisations are generally formulated from domains of knowledge that address the actions of one player or one team. External conceptualisations however are much more conjectural as each outcome is fluid by design. While external conceptualisations are initially formulated on a speculative interpretation of declarative and or procedural knowledge, for example the repetitive actions of an opponent, such conceptualisations are primarily formulated with the awareness that they may be reconfigured according to the environmental information at hand. Likewise, from the literature associated with Complexity Sciences, Fajen et al (2008) and Singleton (2013) respectively have described this notion of responding to the actions of others as the 'reciprocity of perception and action' and the 'ongoing process of knowledge adaptation'. Similarly, research participants define expertise as a coaching practitioner's ability to apply knowledge and accurately respond to the actions of an opponent (see C1.19, C2.5, C4.8, C5.18 and C6.8). As such a link could be drawn between one's capacities for reconfiguring conceptualisations with expertise in interceptive sports coaching.

The advantage offered by conceptualisations lies in the extension of domain-specific knowledge, which in turn enables the coaching practitioner to circumvent the stable patterns of information organisation. Under a strictly cognitive model, domain-specific knowledge is a relatively passive knowledge structure. A coaching practitioner will not access a knowledge domain until a trigger occurs. Once a coaching practitioner recognises the trigger, he or she can than access the appropriate knowledge and calculate a posthumous response. Rather than retrospectively analysing information drawn from interceptive action, a well-considered conceptualisation enables the coaching practitioner

to search interceptive action for indicators of forthcoming opportunity. For example, in the process of designing a specific strategy to respond to a particular attacking or defensive formation, an expert coaching practitioner is able to predetermine discontinuous indicators that are encoded with explicit information. Such explicit information could provide detail regarding the efforts of individuals, the success of a wider plan or even highlight the intentions of an opposing team. Consequently, rather than analysing dated interceptive action, expert coaching practitioners can engage conceptualisations to proactively search for meaningful indicators that represent success or failure to gain an ascendency of some description.

The second abstract concept to feature on this level of the Emergent Decision Making Model is titled Game Configurations. Again the notion of Game Configurations is not a completely innovative concept. Applied Psychologists have recently delivered the results of research that examined how experts from various fields use recognition mechanisms as a means of analysing environmental information in complex activities (see Calvo-Merino, Ehrenberg, Leung and Haggard, 2009). This research suggests that expert practitioners have the capacity to focus on, and comprehend, whole configurations or patterns of information as opposed to searching and analysing isolated features – a trait of the less experienced practitioner (see Lehmann and Gruber, 2006). When applied to interceptive sports coaching, this suggests that expert coaching practitioners have the capacity scan interceptive play for configurations of players or positional patterns that have been encoded according with a series of contextual meanings. These configurations are encoded with only on the most salient information stored in the coaching practitioner's 'Long Term Working Memory' (see Staszewski, 1988).

This idea of encoding game configurations with only the most salient and contextual connotations, enables the expert coaching practitioner to prearrange wells of context specific information. This premeditated association of information to configurations of players and spaces leads to enhanced speed and accuracy of decision making. Devine and Kozlowski (1995) reinforce this point by declaring that the highly skilled basketball coaches involved in their research were able to achieve a superior performance of decision making by encrypting certain characteristics of play with meaningful consequences. The conclusions drawn by Devine and Kozlowski (1995) suggest that highly skilled coaches would scan an entire playing surface for specific combinations or configurations of key players. This research reaffirms this notion that highly skilled

coaching practitioners can control the quality of information drawn from interceptive action by searching the field of action for predetermined configurations between key players and spaces on a field.

The advantages that the Game Configurations concept offers the coaching practitioner rests primarily with efficiency in identifying and analysing the most appropriate information streams. By familiarising themselves with their opponents preferred strategies and the key players that are likely to lead these strategies, an expert coaching practitioner can better control how they scan interceptive action for information (Janelle and Hillman, 2003). Based on the aforementioned assumption of elite interceptive action being highly structured, the expert coaching practitioner can speculate with a fair degree of certainty on the attacking and defensive strategy of their opponents. As a consequence of this heightened understanding, Ferrari, Didierjean and Marmeche (2008) suggest that experts have the ability to maximise their visual exploration strategies to focus more swiftly on the most strategic patterns of a wider spectrum of interceptive play (see also Ericsson and Lehmann, 1996). By recognising the early signs of players aligning themselves into specific spaces, the expert coaching practitioner has direct access to pre-packaged information that stems from all four of the domains of knowledge of the first tier of the 'Emergent Decision Making Model'.

Two Unique Processes of Analysis

The Emergent Decision Making Model is essentially a theory that proposes expert coaching practitioners use an advanced analytical system to initiate a decision making process. At the heart of this analytical system are two unique processes that evolve from what Ecological Psychologists would describe as dynamic patterns of information organisation. These processes explain how some coaching practitioners manage to swiftly identify and analyse only the most pertinent information streams from interceptive action. The first of these two patterns is described as 'Forward Reasoning' and is used in the Emergent Decision Making Model to describe the dynamic patterns of information organisation that expert coaching practitioners use to generate decisions when their team is in possession of the ball. The second pattern is labelled Imminent Awareness and is used to describe the dynamic pattern of information organisation that expert coaching practitioner use to generate decisions relating to an opposing team's defence.

Forward Reasoning

Forward Reasoning[14] is a description of an abstract decision making process that has emerged from the data offered by the six research participants of this study. The notion of experts engaging some higher order perceptual cognitive processes in order to generate decisions has previously attracted the attention of researchers (see Mann, Williams, Ward and Janelle, 2007). However, as Raab and Johnson (2007) suggest past research on expertise in tactical decision making is quite limited. Moreover, past research has been unable to identify or describe the components underpinning these perceptual cognitive processes in any more detail than suggestions alluding to esoteric knowledge (see Lyle 2002). Nash and Collins (2006) provide a very tangible example of this lightly defined quality by describing the decision of German 2006 World Cup coach Jurgen Klinsmann to make match winning positional switches as intuitive. The concept of Forward Reasoning is intended to demonstrate that decisions such as that made by Klinsmann are not the product of an innate ability, but are in fact the product of a learned process, one that is both highly calculated and organised.

Forward Reasoning is an enlightened process that involves the coupling of perception strategies with cognitive structures. Expert coaching practitioners use this process to efficiently survey and analyse interceptive action. The conclusions garnished from this process enable expert coaching practitioners to generate decisions that are orientated towards attacking opportunities. The research of Davids, Button and Bennett (2008) reaffirm this notion of experts engaging advanced exploration strategies by proposing that perception can be heightened when the practitioner is attuned to the 'contextual affordances offered by the environment' (Gibson 1979 in Davids et al., 2008, p. 64). In a similar sense to that offered by Davids and colleagues, the process of 'Forward Reasoning' is fundamentally dependent on the ordered arrangement of these two concepts. For this process to successfully generate decisions the Extended Domain-Specific Knowledge Structure drives a coaching practitioner to search the field of play for specific Game Configurations or abnormalities in these configurations which can be interpreted as a potential opportunity for attack.

[14] This researcher would like to acknowledge the origin of the term Forward Reasoning. Gobet and Simon (1996), Nash and Collins (2006) and Ferrari, Didierjean and Marmeche (2008) have each previously used this term in their research on expertise in Chess.

A coaching practitioner will initiate this process of 'Forward Reasoning' by creating a number of conceptualisations. Essentially, each conceptualisation is a premeditated outcome. These outcomes are fashioned by calculating what might occur if related elements of information from within one domain of specific knowledge or opposing elements of information from two or more domains of specific knowledge were to be played out on a field. This blending of information to calculate a likely outcome is designed to negate the impractical task of using stable patterns of information organisation to identify and analyse temporary streams of information. It is this notion of constructing conceptualisations and potentially adjusting these according to environmental information that establishes an enriched conceptualisation as an example of an 'Extended Domain-Specific Knowledge Structure'.

The expert coaching practitioners examined in this research have each suggested that they will design and implement a game plan that is conceived to test these conceptualisations against the game (defensive) configurations of their opponents. From an attacking perspective, each of these conceptualisations is designed to create instability in the opposing team's defensive configurations (C1.21, C2.14, C3.11, C4.11, C4.18, C5.13, C5.18, C6.11 and C6.15). As such the expert coaching practitioner will direct their focus of attention towards a point on the field where a particular conceptualisation is expected to have an impact on the defensive configurations of their opponents. If the desired outcome does not eventuate, the expert coaching practitioner will redirect their focus of attention to the point at which each conceptualisation is implemented to determine if each conceptualisation is being implemented successfully. As such the Emergent Decision Making Model suggests that the Extended Domain-Specific Knowledge concept leads the coaching practitioner to scan interceptive action for the adjustments (or lack thereof) that an opposing team makes to their (defensive) 'Game Configurations' to establish enough forward reasoning to justify a decision.

An interesting feature about the process of Forward Reasoning is that it is strictly proactive and open-ended. The research participants of this project clearly indicate that when in possession of the ball they are required to create attacking opportunities. As such the injections they make during periods of attack are directly related to the cause and effect response of conceptualisations and the impact that these may have on the wider game plan. This point replicates the research of Ericsson and Lehmann (1996) who have previously proposed a similar notion of searching forward for indicators of opportunity by

suggesting coaching practitioners can maximise their visual searching strategies by focusing on the most strategic patterns of a wider spectrum of interceptive play. The obvious difference between an expert and a less proficient coaching practitioner is that 'Forward Reasoning' informs the expert of where the most strategic patterns of interceptive action will occur and what to expect. Consequently the expert can extract more task related information from quicker visual fixations on the basis that they know where and what to search for.

Imminent Awareness

Imminent Awareness[15], like the concept of Forward Reasoning, is a description of a decision making process that has emerged from the data offered by the six research participants involved in this study. However unlike the process of Forward Reasoning, which describes a perceptual cognitive process used to generate decisions relating to attacking opportunity. The process of Imminent Awareness is a description of another perceptual cognitive processes that expert coaching practitioner's use to generate defensive decisions.

More explicitly, Imminent Awareness is a process used by expert coaching practitioners to expeditiously anticipate the attacking plans of an opposing team. The research of Vickers, Reeves, Chambers and Martell (2004) and Calvo-Merino, Ehrenberg, Leung and Haggard (2010) most clearly highlight the contribution that anticipatory decision making play in the determination of expertise. While the research Vickers et al., (2004) highlights the use of direct attentional focus of athletes to anticipate specific triggers, the research of Calvo-Merino (2010) goes one step further by concluding that expert Ballet dancers demonstrate a configural perceptual mechanism that enable them to anticipate and process specific actions as opposed to individual elements of a discrete action. However, apart from confirming that experts can anticipate their opponent's intentions significantly quicker than their less skilled peers, recent research has offered very little explanation regarding how expert interceptive sports coaches manage to anticipate the ominous actions of their opponents. The following explanation of Imminent Awareness is intended to offer some

[15] This researcher would like to acknowledge the origin of the term 'Imminent Awareness'. Erickson, Cote and Fraser-Thomas (2007) have previously used this term in their research.

insight regarding how the six research participants of this project suggest they formulate decisions based on their ability to anticipate the intentions of their opponents.

As was the case with the preceding concept of Forward Reasoning, a coaching practitioner will initiate this process of Imminent Awareness by first familiarising himself with the sequential characteristics and situational features that define their opponents preferred attacking patterns. From this review and in concert with their deep understanding of the three aforementioned tactical domains of knowledge[16], the expert coaching practitioner will use these defining characteristics and features to establish a series of internal conceptualisations (see page 174) that when combined form configurations of opposing players. Each configuration is a representation of specific groupings of opposing players and their efforts to move into certain spaces and field positions that in turn are indicative of an impending pattern of attack. Ward and Williams (2003) describe this practice of encoding configurations of positional roles and field locations with impending action as the formulation of advanced perceptual cues. Once these configurations are encoded with such situational features they are logged into the coaching practitioners working memory. With these configurations logged to memory the expert coaching practitioner is free to scan interceptive action for the movements and groupings of key opposing players that possess the skills to initiate a specific pattern of attack.

The task of scanning interceptive action for the movements of key players into specific groupings and spaces is made more efficient by engaging external conceptualisations from an Extended Domain-Specific Knowledge Structure. In addition to reviewing the attacking patterns of an opposing team, an expert coaching practitioner will simultaneously familiarise himself with the skill set of each opposing player and the roles they fulfil for their team. Consequently, this notion of blending one's knowledge about a player's skill set (Player Attributes) with certain knowledge structures from the Game Attributes domain and or the Principles of Play domain would constitute the formation of external conceptualisations. As such, the expert coaching practitioner will scan interceptive action for the alignment of these external conceptualisations with renowned configurations to gain an insight into imminent action.

[16] 'Game Strategy', 'Game Attributes' and 'Principles of Play' domains of knowledge

In terms of athletic performance, the time between the recognition of a perceptual cue and the initiation of a movement by an opponent need not be that great as the cause and effect responses are played out in near simultaneous time. However, in the context of interceptive sports coaching, the external location of the coaching practitioner to the field of play necessitates a much more demanding period of anticipation. Abernathy, Gill, Parks and Packer (2001) add to this notion of early anticipation by suggesting that experts are more attuned to kinematic information such as depth perception and the seminal indicators of directional adjustments. Consequently the configurations that an expert coaching practitioner will lock into the working memory are the preceding movements and groupings of players as they work towards a specific configuration of players and space to launch a pattern of attack. However each preceding movement is only made relevant if the coaching practitioner can marry these movements with meaningful external conceptualisations. As such the 'Emergent Decision Making Model' suggests that when in defence, expert coaching practitioners will first use recognisable configurations as a template to guide their search of interceptive action for external conceptualisations that allude to imminent action.

Chapter Summary

Forward Reasoning and Imminent Awareness are labels that this researcher has used to describe how the participants of this study combine established cognitive structures to form conceptualisations and use these identify and make sense of situational variants and invariants to generate decisions. In accord with the research of Davids et al., (2008) the dynamic nature of these two unique processes of analysis rests within a practitioners ability to remain attuned to the contextual affordances offered by the environment. However, the difference here rests within the recognition of which construct (EDSKS or Game Configurations) precedes and activates the other when making decisions. Forward Reasoning describes an attacking decision making process that involves the coaching practitioner using Extended Domain-Specific Knowledge Structures (internal and external conceptualisations) to search for specific Configurations of players (situational invariants and to a lesser degree situational variants). The process of Imminent Awareness describes a defensive decision making process that involves the use of Configurations of players (in this case predominantly situational variants and to a lesser degree situation

invariants) as the key to accessing and making sense specific Extended Domain-Specific Knowledge Structure (Internal and external conceptualisations).

It is the sequencing of these two abstract concepts that defines each process of analysis. It is also this sequencing, or dynamic pattern of information organisation that separates the Emergent decision Making Model from the outcomes of earlier research endeavours such as Chunk Theory (see Chase and Simon 1973) and concepts such as 'seeing' aspect of Vickers, Reeves, Chambers and Martell's Decision Training Process (2004). Where systems such as Chunk Theory use a precise information processing language to propose a model for expertise in the domain of chess, the Emergent Decision Making Model recognises that experts cannot be constrained by such linear frameworks that require the processing of a myriad of possible action and response algorithms.

The Emergent decision Making Model is inherently dependent on a coaching practitioner's ability to access and make use of both perceptual cognitive and analytical skills – as opposed to storing and accessing declarative knowledge. The Emergent Decision Making Model concedes that for a decision to emerge from a dynamic and highly contested environment, a significant investment of cognitive analysis in similar contextual environments must have been made prior to a decision emerging from the field. However this model is defined by a dynamic perceptual cognitive link that enables the coaching practitioner to alter the way they store and access experiential knowledge and couples this knowledge with interceptive action to garnish a higher order of understanding.

7. Chapter Seven – Conclusions and Recommendations

7.1. Conclusions

The quality of the outcomes drawn from this research can be attributed to the methodological approach and the mode of reasoning used to frame this research. As indicated in chapters two and three, previous research that examines the phenomena of expertise in interceptive sports coaching has been stymied on two fronts. Firstly, by a professional body that remains divided on how best to locate expertise and secondly by theoretical frameworks that cannot decipher abstract phenomenon such as expertise in interceptive sports coaching. This perspective is supported by the research of Jones, Armour and Potrac (2003). Jones and company have suggested that past research has chosen to ignore the dynamic and contextual variables that define performance coaching. Consequently Jones and his colleagues suggest that research of this strain has only clouded our understanding of how expert coaching practitioners' function. Similarly O'Leary (2010) suggests that future investigations of this nature should adopt a research framework that does not pre-empt the research direction or outcomes by implementing a predisposed theoretical base at the beginning.

With the recommendations of Jones and company and O'Leary in mind, it was decided that 'Grounded Theory' would prove the most suitable methodological approach to advance our understanding of expertise in interceptive sports coaching. In concert with inductive reasoning, Grounded Theory presents an opportunity for 'theory in progress' to materialize from the data rather than imposing subjective theory on the data. Gray (2009) supports this style by suggesting that such a methodological approach allows theories to evolve and mature over the natural course of the research. However as a consequence of this approach it is not completely possible to regulate the direction or speed at which the research develops.

This was certainly the case here. For example, the first two research questions were designed to ensure that an objective interpretation of an expert practitioner could be established. This was an essential step in the research process, as a benchmark was required to validate any unique generalisations that may emerge from the final two

questions. However the multitude of responses offered by the research group to questions 1 and 2 would suggest that these initial questions could have offered research participants more direction. Nevertheless, rather than detracting from the research, this preoccupation with validation has actually enriched the diagnostic features[17] that were engaged to explain the processes expert coaching practitioners use to generate decisions.

As a consequence of this methodological approach, mode of reasoning and system of analysis, this thesis will present six conclusions that have been drawn from the research process. The first conclusion is based on a reflection of past research that frames our existing understanding of expertise in interceptive sports coaching. Each conclusion thereafter is unique to this research and is directly related to the outcomes drawn from this research endeavour.

7.1.1. First Conclusion – A reflection on past research endeavours.

In response to the first research question – 'How can we identify expertise in interceptive sport coaching'; each of the research participants offered a great number of traits that they considered being suitable indicators of expert practice. In accordance with Strauss and Corbin's (1998) conditional matrix, all exemplars of expertise as offered by the research group, were exposed to the three phases of coding. This coding process resulted in all exemplars being classified according to reoccurring concepts and subsequently collated into a series of categories. Each of these categories took on the form of characteristics and behaviours of an expert coaching practitioner. As a consequence of this cataloguing procedure, the research group had collectively identified twelve categories of characteristics and behaviours that are representative of expertise. Interestingly, four of these twelve categories had featured more notably in the responses offered by research participants.

While most of these twelve categories are established knowledge structures or practices, four of these twelve categories have figured prominently in the review of literature that underpins this research. These four prevalent categories have previously been described or defined as Reflective Practice (see Demers, Woodburn and Savard, 2006; and Cushion

[17] The three analytical features referred to, are creating a storyline, network of categories and refining categories and are optional analytical devices used in the Selective Coding phase of Strauss and Corbin's Conditional Matrix. (1998)

et al., 2006), Creative Practice (see Nelson and Cushion, 2006; and Jones and Turner, 2006), Innovative Practice (see Coyle 2009), and Informal Learning (see Mallett, Trudel, Lyle and Rynne 2009). Not surprisingly, each of these four categories has previously been vetted as independent attributes of an expert practitioner. However rather than reaffirming these categories as indicators of expertise, it is the conclusion of this research that this replication of past outcomes is an indication of a professional predisposition for canonized knowledge. In fact Gillham (2000) suggests that a replication of formalized knowledge structures should be perceived as a recognizable predilection for the hegemonic maintenance of empirical knowledge. As such these four categories are not offered here as four independent indicators of expertise – as they are in the research of others, but as four examples of a research process that Jones, Armour, and Potrac (2003) describe as a naive acceptance of a professional innocence.

Consequently, the first conclusion drawn from this research is based in the literature but reinforced in the responses of the research participants to the first set of research questions. More specifically this first conclusion is a statement declaring that past research has left academics and coaches alike with an opaque understanding of expert practice in interceptive sports coaching. The subjective nature in which expertise has been determined and a research penchant for reductionism have rendered expert interceptive sports coaching to a series of isolated, decontextualised fractions of a holistic practice. Past research has played a full and complete role in developing our professional understanding of the conscious practices that sustain interceptive sports coaches. However, it is now time to follow the lead of researchers such as Devine and Kozlowski (1995) who suggest that indicators of expertise could be found in the unconscious processes that sustain conscious practice.

7.1.2. Second Conclusion – Confirmation of a research direction

The second research question – ‘Can we use decision making as an indicator of expertise’; marked two significant points in this research process. Firstly, in spite of some concern regarding the type of decisions that would be examined, the responses offered by the research participants acceded to the fact that decision making could stand further investigation as an indicator of expertise. Secondly, it was this second set of research questions that encouraged the research participants to move beyond a retrospective

analysis of the conscious actions involved in a decision making process and to begin considering what it was that motivated these conscious practices.

In terms of research driven conclusions, this second set of questions confirmed that each research participant involved in this study believed that decision making could stand up to further examination as an indicator of expertise. While this result is a tangible conclusion in its own right, to suggest that it was an unexpected would be inaccurate. Again the literature underpinning this field of study is testament to the fact that researchers have been proposing decision making as an indicator of expertise for more than twenty years. However, rather than restating a superfluous conclusion, having each member of the research group recognize that decision making as a suitable indicator of expertise was an essential step in the process of fostering reflective inquiry. For reflection to be a genuine lens into the world of practice, it was important that the nature of reflection be identified in such a way that it offers the research participant a way to question the taken for granted assumptions that frame their daily practices.

7.1.3. Third Conclusion – Personalised analogies

The third set of research questions were designed to determine how the expert coaching practitioners in this research group generate decisions. In the process of subjecting the twelve categories of characters and behaviours to the Axial and Selective Coding phases of the analysis process, four distinct patterns of behaviour began to emerge. The first of these behaviours have been labelled in the preceding chapter as: an information filtering system and has been described factually and symbolically as the ‘Stability / Instability Exchange Model’.

The Stability / Instability Exchange Model is the figurative representation of a collective narrative, or storyline. In a response to Fajen et al., (2008) call for research that commits to the idea that actors can achieve direct epistemic contact with their environments, this collective narrative offers an explanation of the abstract processes that the research participants use to ensure that they are cognisant of the most pertinent streams of environmental information. Future research may engage a more extensive research group, or even collect data from a broader field of participants. Either way it is reasonable to expect that such variables will incur some alterations to the narrative, or warrant a refining of the core categories that constitute these storylines. However, regardless of the

variations, it can be concluded that expert coaching practitioners do create and use personalised analogies and that these analogies interpret interceptive action as a constant exchange of reciprocal forces and objectives. In addition to this notion of using personalised analogies to locate and decode the most valuable environmental information streams, these analogies are also used to aid in the communication process. By maintaining a constant personalised analogy, an expert coaching practitioner is able to create a certain level of continuity in how messages are delivered and received by coaching and playing staff.

7.1.4. Fourth Conclusion – Conceptualisations

The fourth conclusion like the preceding conclusion has been extrapolated from the responses offered by research participants to the third set of research questions. However unlike the third conclusion, which describes how expert coaching practitioners filter environmental information, this fourth conclusion is focused on how expert practitioners arrange and use domain specific knowledge structures.

The nature of knowledge and the shape of the knowledge structures supporting interceptive sports coaching has long been the subject of academic deliberation. There are equally sizable bodies of research that position one domain of knowledge and process of knowledge acquisition as being more valuable than others. However the work of Ford, Coughlan and Williams (2009) clearly indicates that there is no significant difference between the extent of domain specific knowledge acquired by expert and novice coaches. Consequently, it would be fair to suggest that a defining feature that may separate expert coaching practitioners from their peers is how they use and apply domain specific knowledge.

As previously mentioned, traditional perspectives on how experts arrange and use knowledge structures vary according to the research paradigm from which each research originates. For example, cognitive psychologists promote an information processing model (for examples see Klein, Claderwood and Clinton-Cirocco, 1986; Endsley, 1995). Whereas ecological psychologist, espouse a more dynamical perspective (for examples see Araujo, Davids, Hristovski, 2006). However, in spite of this difference, the findings from this

research indicate that expert coaching practitioner's use and apply knowledge in a manner that borrows from both research paradigms.

The expert coaching practitioners engaged in this research have indicated that through extensive planning they are able to combine their domain specific knowledge (of their game) with an experiential knowledge (of their opponents) to create 'conceptualisations'. Each conceptualisation is a calculated outcome that may eventuate if certain opposing forces or objectives are played out against one another in live interceptive action. Expert coaching practitioners suggest that they use these conceptualisations as an outline to chart the intentions of their opponents and the effectiveness of their own plans. Consequently the fourth conclusion drawn from this research is a suggestion that expert coaching practitioners prepare and use 'conceptualisations' to better understand the state of impending play and as such are better positioned to calculate accurate decisions.

7.1.5. Fifth Conclusion – Forward Reasoning

The fifth conclusion drawn from this research is also etched from the responses offered by participants to the third set of research questions and is labelled Forward Reasoning. This conclusion is intended to explain the process that these research participant's use to generate attacking decisions. While the notion of a process of Forward Reasoning has previously been raised by and Gobet and Simon (1996); Nash and Collins (2006) and Ferrari, Didierjean and Marmeche (2008), this conclusion is intended to add onto the work of these researchers. Forward Reasoning is an explanation of how expert coaching practitioners use analogies and conceptualisations to garnish environmental information to enable attacking decisions to emerge from the field of play ahead of time.

In the process of critiquing the responses offered by the research participants to questions concerning decision making, it became apparent that they each use a different decision making process for attacking and defensive decisions. With regards to attacking decisions, it was discovered that the research participants relied heavily on their planning to initiate a decision making process during interceptive action. Each research participant implied that they would familiarize themselves with their opponents to such an extent that they could readily identify and deconstruct their opponent's defensive formations and strategies. Armed with this heightened understanding of their opponents defensive capabilities, the

expert coaching practitioner will prepare a series of attacking actions that when applied accurately are intended to create specific signs of potential instability within their opponents defensive formations.

These specific signs of instability are the desirable outcomes of a preconceived conceptualisation – a calculated outcome of what might occur if the attacking team can align and apply the appropriate forces. Accordingly, an expert coaching practitioner will use this personalised interpretation of interceptive action to seek out the specific signs of instability that each conceptualisation is designed to create. Consequently the fifth conclusion is a suggestion that expert coaching practitioners will generate attacking decisions by applying a process of Forward Reasoning. This process of Forward Reasoning involves the coaching practitioner initiating a series of internal conceptualisations (page 174) to highlight specific streams of environmental information (external conceptualisations, page 174) that are unintentionally offered by opponents and allude to elements of defensive instability.

7.1.6. Sixth Conclusion – Imminent Awareness

This final conclusion is in response to research question 1.3 and is similar to the process earlier described as Forward Reasoning. However, this final conclusion describes how expert coaching practitioners use environmental information to access conceptualisations that enable the emergence of defensive decisions. This procedure has been labelled as a process of Imminent Awareness. While similar notions of 'Imminent Awareness' have previously been raised by researchers examining the decision making skills of expert coaching practitioners (see Endsley, 1995; and Erickson, Cote and Fraser-Thomas, 2007). This representation draws a procedural account of how the research participants use information and knowledge to generate a seemingly advanced understanding of an opponent's action.

While the notion of planning again plays a formative role in the early stages of this defensive decision making process, the contribution of planning to this procedure is not nearly as structured as it is in Forward Reasoning. The task of reacting to the dynamic movements of an opponent requires the defensive coaching practitioner to adopt a more randomized approach to seeking environmental information. For generating defensive

decisions, the research participants suggest that they are more inclined to rely on their deep understanding of game strategy and principles of play. Therefore, the research group suggests that they formulate any possible number of conceptualisations that stem from these two domains of knowledge and logged these into the long term working memory (see Simon and Gobet, 1996; and Tuffiash, Roring and Ericsson, 2007). However rather than impose these conceptualisations onto a piece of interceptive action, the expert coaching practitioner will scan the field of play for signs of early alignment or configurations of key players (environmental information) that can deliver some insight regarding which conceptualisation is about to unfold.

Consequently the sixth conclusion suggests that expert coaching practitioners will generate defensive decisions by applying a process of 'Imminent Awareness'. This process of imminent awareness involves the coaching practitioner using environmental information in the form of specific configurations of key attacking players (see Ferrari, Didierjean and Marmech, 2008) to identify specific conceptualisations that are full with information regarding the attacking intentions of their opponents.

7.2. Recommendations

With the benefit of hindsight the following eight points are offered as recommendations that this researcher would offer to any subsequent research that endeavours to examine expertise and the decision making process of interceptive sports coaches.

7.2.1. Research Questions: A recently established subject area

For reasons of validation, it was imperative that each research participants offered decision making as a potential indicator of expertise. However, due to a number of factors such as language and reasoning skills of the research group, a considerable amount of time and effort was lost in the data collection phase while research participants grappled with the questions. Prior to 2010 the literature advocating decision making as an indicator of expertise was spasmodic. However of late there has been a noticeable increase in the number of published research articles from the field of Ecological Psychology that promotes decision making as an indicator of expertise. Consequently on the strength of

this published material advocating expertise and decision making, it is recommended that future research accept decision making as an indicator of expertise.

7.2.2. Research Questions: A singular research focus

As indicated at the commencement of chapter 5 and as is expected with 'Grounded Theory', the questions that framed this research process were in a constant state of change. This was not due to a lack of suitable research direction or planning, but more a case of perpetually evolving data. This point is most clearly evidenced by the fact that the majority of conclusions that were drawn from this research originate from the third set of research questions. In fact the volume of data drawn from the third set of research questions proved so enlightening that it renders the fourth set of questions as superfluous. The content garnished from the third set of research questions proved so extensive that it is reasonable to suggest that the research direction targeted in the fourth set of research questions was perhaps too ambitious. Due to the narratives drawn from the first three research questions, there is now a need to further examine the abstract concepts garnished from these questions before we can do justice to the four set of research questions. Consequently this second recommendation is a simple declaration the future research examining correlations between expertise and decision making need not cloud the research process with other areas of focus such as development or education.

7.2.3. Research Group: A larger cohort

As indicated in chapter four, this study engaged a group of six research participants. Each of these participants was identified according to a selection process that involved five distinct selection criteria. This selection process proved highly successful as it identified a diverse research group of expert practitioners from three interceptive sports and from performance levels that are not always associated with expertise[18]. While the five selection criteria ensured a diverse and highly qualified research group the research process may be questioned by some due to similarities in age, gender and the coaching histories of the

[18] Research participants 2, 3 and 5 are currently plying their trade in competitions other than those that are generally associated with expertise e.g. female competitions in male dominated sports, second tier international and national competitions.

research participants. Nevertheless, rather than detracting from this research, it can be argued that these similarities are more an indication of the wider demographics of the coaching population that practice at these performance levels.

Unrelated to the possibility of these aforementioned concerns, it is still recommended that future research in this area engage a larger research group. It is the opinion of this investigator that this research has laid a solid platform from which future research can test the conclusions for replication across a larger research cohort.

7.2.4. Research Group: A wider spectrum of sports

This fourth recommendation is similar to the previous suggestion. One of the advantages of Grounded Theory is that as a research framework it embraces the introspective knowledge of the research participants and the intuition of the researcher, particularly one with a background in subject area (Huberman and Miles, 2002). Accordingly this research purposefully targeted three specific interceptive activities of Football (soccer), Rugby League and Rugby Union to maximise the analytical process by engaging these introspective and intuitive understandings of the subject matter. While this process proved to be advantageous, the platform has now been laid for future research in this area to consider practitioners from other interceptive sports (as opposed to blending introspective and interceptive sport coaches in the one research cohort). As such it is the fourth recommendation that future research in this area consider identifying research participants from a wider spectrum of interceptive sports. Additionally by identifying coaching practitioners from other interceptive sports such as Netball, Basketball, Water Polo and Australian Football it is likely that we can broaden the gender and age groups of research participants to ultimately enrich the research outcomes.

7.2.5. Expertise: Beyond absolute and relative comparisons

The fifth recommendation originates predominantly from difficulties encountered with the review of literature. While access to published research is plentiful, repetition and fragile associations with other domains of expertise have reduced the quality of the content offered in these publications. This recommendation reasserts the views of Chi (2006) who

suggests that much of the research that currently sustains our understanding of expertise in sports coaching is thwarted by absolute and relative determinations of expertise. Additionally, based on personal experience of reviewing related literature, this researcher would suggest that the academic fraternity has unintentionally stymied our understanding of expertise in sports coaching. By naively drawing comparative associations with other fields of expertise the well-intended efforts of the academic fraternity have inadvertently clouded our perception of expert practice. Accordingly, this fifth recommendation suggests that future research endeavours that examine expertise in sports coaching be more discerning with how they identify expert practitioners so as to avoid issues associated with conflation and qualifying the experts engaged in the research process.

7.2.6. Expertise: Avoiding innocence

This recommendation is an extension of the previous recommendation and reaffirms the views of Jones, Armour, and Potrac (2003). Jones and colleagues have suggested that for the benefit of advancing our understanding of expertise in sports coaching it is essential that researchers avoid self-handicapping by innocently ignoring the contextual realities that frame competitive sports. Similarly, it is the experience of this researcher that the body of published information supporting our existing considerations of expertise in coaching practice are substantiated in reductionist research (see Heng 2008). As a consequence there is a plethora of information that isolates singular aspects of a complex process and positions these aspects as indicators of expertise. While this research has added to our understanding of the generic characteristics underpinning coaching practice, it does not present a contextual representation of expertise in interceptive sport coaching. As such this sixth recommendation is again a plea for future research to move beyond the principles of reductionism and engage in research approaches that focuses on understanding expert performance within the context of practice.

7.2.7. Expertise: Accepting experts are autodidactic

There appears to be an escalating stream of published research that proposes a need for a greater resolve within research that examines the development of expertise in sports coaching. This point is most clearly reinforced by the dedication of an entire issue of the

International Journal of Sports Science and Coaching in 2009 to the Formal / Informal Coach Education debate. While it is not my intention to suggest that such an examination of peripheral factors is contrary to a garnishing a richer understanding of the processes that lead towards expertise in sports coaching, I am somewhat concerned about revisiting such well-research themes with an expectation that greater resolution of analysis will result in greater quantity and quality of understanding.

Using volume 4: issue 3 of the aforementioned Journal as an example, there are two well researched themes that are explored in detail, yet their contribution towards a richer understanding of each theme remains questionable. The first of these is concerned with the education learning causality dilemma. The academic fraternity has written at length about the relationship between education and learning and apart from the odd exception there appears to be consensus that education is regarded as the institutionalisation of learning and as such is figuratively the site for social provision of learning (Jarvis 2006). However, in spite of this wider consensus (see Jones & Turner, 2006; Nelson & Cushion 2006), some researchers in the sports science field have unwittingly distorted the boundaries of formal and lexical semantics when using the terms education and learning to explore the development of expertise in sports performance and or coaching (see Mallett, et al., 2009). In fact others have further complicated the situation by adding to this impasse by recommending the notion of 'development' be acknowledged as third and equal contingent of the education learning causality dilemma (see Cassidy, 2009). While such endeavour should be applauded, early career researchers and coaching practitioners alike should be aware that such altruistic analysis does not always translate to clear waters.

The second theme that is explored in the aforementioned journal is that concerning the Formal / Informal coach education dichotomy. By admission, Mallett et al., (2009) suggest that the motivation for their publication was to stimulate an ongoing and often sterile debate about formal and informal coach education and in the process provide some clarity regarding the terminology that encapsulates this debate. While I do not deny that this debate is ongoing, I question whether it needs to be ongoing. For example, the review of literature that accompanies this thesis is quiet clear on the fact that formal coach education is on occasion found wanting and that expert coaching practitioners have garnered learning opportunities in environments that are external to the boundaries of formal education (see Gould et al., 1990; Lyle 2002; Cushion et al., 2003; Hammond & Perry,

2009; Coyle, 2009). However, in defence of Mallett and his colleagues they have reintroduced the Moon's notion of non-formal learning (see Moon 1999). However, their argument for non-formal learning is overshadowed by an inconsistent application of Merriam et al., (2007) theoretical framework for defining formal education and a fickle description of non-formal learning opportunities as 'slightly less formal'.

These inconsistencies are not raise as a means for justifying change in research; however, they do provide the stimulus for this seventh recommendation. Clearly a cursory examination of the literature reveals a number of verifiable facts regarding the education / learning dilemma and the formal / informal coaching education dichotomy. Consequently it is recommended that impending research now build onwards from the past by accepting the pluralism of education and that this notion of pluralism equates education with learning rather than perceiving the two as separate entities. In extension of this notion of pluralism and on the basis of the conclusions garnered from this research thesis, it is also recommended that future research accept that experts are autodidactic. Once the foundations of practice have been laid an expert engages in self-directed learning experiences that are contemplative and an absorptive process. Such self-directed learning endeavours occur externally to the boundaries of formal education and are related to but different from informal learning experiences. To search for a more comprehensive label would be to engage in peripheral debate.

7.2.8. Research Methodology: A suitable framework

There will always be academic debate regarding the merits of qualitative research, particularly from those with a history in quantitative research. However as Gray (2009) and O'Leary (2010) each suggests, some phenomena are just too complex to be accurately measured according to the traditional parameters of quantitative research. Such a multifarious appreciation of expertise in interceptive sports coaching and the rigidity of quantitative research are by default the most likely reason so much research in this area has adopted a reductionist framework. Nevertheless, Wiersma (2000) suggests that much of the apprehension for qualitative approaches demonstrated by quantitative researchers can be overcome by a conscientious coupling of research methodologies with stringent systems of data analysis.

Concurring with the views of Wiersma (2000) this recommendation confirms the suitability of uniting 'Grounded Theory' and Strauss and Corbin's 'Conditional Matrix'. Combined, these two procedures create a non-linear methodological approach that is capable of generating impartial theory in a research area that is clouded with preconceived interpretations that in reality should be discarded.

7.2.9. Future Research: Developing the Emergent Decision Making Model

As mentioned above, the fourth set of research questions have contributed greatly to the confirmation of the abstract concepts generated in the first three sets of research questions. Independently however this fourth set of research questions has not generated any grand conclusions that warrant specific discussion in this section of a thesis. Consequently this final recommendation is concerned with sequencing future research endeavours to maximise our professional understanding of expertise in interceptive sports coaching. Future research should focus on developing or discrediting the two aforementioned models and four supporting abstract concepts prior to examining whether or not these processes can be introduced to fast track the development of coaching practitioners.

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